InnoEducaTIC 2024

XI Jornadas Iberoamericanas de Innovación Educativa en el ámbito de las TIC y las TAC

Las Palmas de Gran Canaria, 20, 21 y 22 de noviembre de 2024

Editores:
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Grupo de Innovación Docente
Aplicaciones Tecnológicas para la Enseñanza de las TIC (ATETIC)

Universidad de Las Palmas de Gran Canaria
Despacho 102, Pabellón B,
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Prólogo

Las ***XI Jornadas Iberoamericanas de Innovación Educativa en el Ámbito de las TIC y las TAC (InnoEducaTIC 2024)*** ofrecen un espacio para compartir e innovar en educación, explorando el uso de Tecnologías de la Información y Comunicación (TIC) y Tecnologías Emergentes aplicadas pedagógicamente como Tecnologías para el Aprendizaje y el Conocimiento (TAC). Estas herramientas buscan transformar la enseñanza y fomentar competencias clave en el estudiantado.

Aunque la tecnología es fundamental en la educación actual, el foco de estas jornadas está en el compromiso pedagógico: la calidad de la enseñanza y el papel de quienes educan son esenciales para aprovechar las herramientas tecnológicas y mejorar los procesos educativos. *El objetivo es integrar tecnología y pedagogía para garantizar una educación de calidad que prepare al estudiantado para los retos del siglo XXI.*

En esta edición, destaca la participación de la ***Alianza ERUA2 (European Reform University Alliance),*** que presentará iniciativas interuniversitarias centradas en la investigación y la innovación educativa. Este enfoque multidisciplinar y cooperativo refuerza la filosofía de las jornadas: construir una educación inclusiva, transformadora y adaptada a un mundo en constante cambio.

InnoEducaTIC 2024 es, en definitiva, una oportunidad para crear conexiones, intercambiar ideas y fomentar colaboraciones que impulsen la educación. Estamos seguros de que estas Jornadas serán un espacio inspirador donde tecnología y pedagogía se unan para abrir nuevas oportunidades en el aprendizaje.

Las diferentes áreas temáticas de InnoEducaTIC 2024 son las siguientes:

1. Innovación educativa y metodologías activas
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3. Gamificación y aprendizaje basado en proyectos
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5. Aprendizaje-servicio (ApS)
6. Evaluación y mejora del rendimiento
7. Competencias y habilidades transversales
8. Tecnologías digitales
9. Recursos digitales y materiales didácticos
10. Tecnologías emergentes
11. Aprendizaje colaborativo y cooperativo
12. Enfoques multidisciplinares
13. Enfoques para la enseñanza de lenguas extranjeras

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14. STEM y competencias tecnológicas
15. Aula invertida (Flipped Classroom)
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Título: **Formación y Acreditación en Competencias Digitales Docentes en la Universidad**

RESUMEN

La formación y acreditación en competencias digitales docentes en la universidad permite que el profesorado mejore sus competencias profesionales y pedagógicas, facilitando, además, que su estudiantado desarrolle sus propias competencias digitales. Por lo tanto, la digitalización en la educación universitaria es un pilar fundamental para el desarrollo de entornos colaborativos eficientes y la mejora continua del proceso de enseñanza-aprendizaje. En el marco del proyecto DigCompEduFyA, los grupos de trabajo de Formación y Acreditación llevamos más de dos años trabajando en: i) crear contenido que facilite la adquisición de las competencias digitales docentes, ii) acercar el MRCDD a la comunidad universitaria creando un MCDDU y iii) establecer protocolos y recomendaciones que permitan la acreditación y el reconocimiento de estas competencias por parte de organismos externos.

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Dr. D Jesus B. Alonso-Hernández, Catedrático de Universidad y director del Experto Universitario en Competencias Digitales Docentes (ULPGC) y Coordinador ULPGC del proyecto DigCompEdu´Formación y

Dra. Dña. Magnolia Troya Déniz, Profesora Titular de Universidad

Título: **ULPGC en el proyecto DIgCompEd-FyA**

RESUMEN

El proyecto DigCompEdu - Formación y Acreditación (FyA) es un proyecto colaborativo, en el que participan más de 40 universidades españolas, enmarcado dentro del programa UniDigital del Ministerio de Universidades el cual está financiado por el Plan de Recuperación, Transformación y Resiliencia del Gobierno de España y la Unión Europea -NextGenerationEU. El objetivo del proyecto es el desarrollo de elementos de autoformación (MOOCs) para mejorar las competencias digitales del profesorado universitario, en el Marco europeo para la competencia digital de los educadores: DigCompEdu. En esta comunicación se presentarán los diferentes MOOCs desarrollados por la Universidad de Las Palmas de Gran Canaria (ULPGC), así como las estrategias seguidas en el diseño, implementación y puesta en explotación.

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Sesión Plenaria

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Vice President Digitalization and Quality Management Professor of Business Informatics with a focus on autonomous driving Wildau University of Applied Sciences

Título: **Things were better in the old days - On the trail of a myth and possible approaches**

RESUMEN

Can there be “business as usual” in the field of higher education? Are students today really lazier than they used to be? Is everything online always better? Do the students need to change or perhaps the universities too?

Individual ideas and approaches in the area of project-oriented and interdisciplinary teaching at the local university will be outlined and described in relation to these aspects.

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Percepción del estudiante sobre el aprendizaje y la metodología desarrollada en prácticas de laboratorio de Higiene Alimentaria en el Grado de Veterinaria.

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Keywords: Seguridad Alimentaria, prácticas de laboratorio, percepción de metodología, aprendizaje.

1. INTRODUCCION

Las prácticas de laboratorio han sido consideradas, durante mucho tiempo, como un componente esencial en la formación de estudiantes universitarios en diversas disciplinas, particularmente en aquellas que requieren el desarrollo de competencias técnicas y profesionales, como es el caso de la Veterinaria. Así, las prácticas proporcionan a los estudiantes una oportunidad invaluable para aplicar los conocimientos teóricos adquiridos en el aula a situaciones reales o simuladas, fortaleciendo así su comprensión y habilidades prácticas. De acuerdo con Kolb (1984) [1]., el aprendizaje experiencial es un proceso mediante el cual el conocimiento se crea a través de la transformación de la experiencia. Así como Boud et al. (2011) [2] el aprendizaje práctico permite a los estudiantes no solo experimentar, sino también reflexionar sobre las actividades realizadas, facilitando una integración más profunda de los conocimientos. En el ámbito de la educación superior en ciencias de la salud, estudios como los de Norman y Schmidt (2000) [3], han demostrado que las prácticas clínicas y de laboratorio son cruciales para el desarrollo de la competencia profesional. Estos enfatizan la importancia de vincular la teoría con la práctica para facilitar la transferencia de conocimientos y habilidades a situaciones reales.
Este trabajo evalúa la percepción por parte del estudiantado, de las prácticas de laboratorio impartidas en la asignatura de Higiene y Protección Alimentaria (HIPRA) del Grado de Veterinaria de la ULPGC, mediante una encuesta docente de elaboración propia que incluye 10 cuestiones sobre la apreciación de la metodología empleada (ítems 4, 7, 8 y 9) y sobre la utilidad y aprendizajes obtenidos (ítems 1, 2, 3, 6 y 10). Diversos estudios han destacado la importancia de las prácticas de laboratorio en el desarrollo de competencias profesionales y en el proceso de aprendizaje universitario. Por ejemplo, varios autores encontraron que los estudiantes que participaron en estas actividades mostraron una mayor comprensión de los conceptos científicos y una mejor capacidad para resolver problemas. Además, otras investigaciones sugieren que las prácticas de laboratorio pueden fomentar el aprendizaje activo y colaborativo, lo cual es fundamental para el desarrollo de habilidades. Las experiencias prácticas aumentan la comprensión y la retención de los conocimientos teóricos, ya que los estudiantes tienen la oportunidad de aplicar lo que han aprendido en un entorno práctico. El presente estudio tiene como principales objetivos identificar si hay aspectos mejor y peor valorados por los estudiantes en relación con el desarrollo de las prácticas de laboratorio en la asignatura de Higiene y Protección Alimentaria, así como proponer mejoras metodológicas para incrementar tanto el grado de satisfacción como el aprendizaje de estos. A través de un análisis detallado de las opiniones y percepciones de los estudiantes, se pretende obtener información valiosa que permita ajustar y optimizar las estrategias docentes empleadas en las prácticas. Con ello, se busca no solo mejorar la calidad del aprendizaje práctico, sino también fomentar una mayor motivación y compromiso por parte de los estudiantes, promoviendo un ambiente de formación más efectivo y acorde a las necesidades profesionales del futuro veterinario.

2. METODOLOGÍA

El desarrollo de las prácticas se realizó en los laboratorios de uso común de la Facultad de Veterinaria, basadas en el control microbiológico de alimentos, superficies, y aguas. Participaron 59 estudiantes, que fueron todos los matriculados en un curso académico en la asignatura de HIPRA (cuarto curso del Grado, con un número máximo de 10 estudiantes por grupo.

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La encuesta se elaboró según los criterios propios del interés del profesorado de la asignatura de HIPRA acerca de aquellos aspectos que pudieran ser útiles para conocer la opinión del estudiantado y decidir la aplicación de medidas correctoras en la docencia impartida en estas prácticas de laboratorio. Para su diseño se consultaron y escogieron descriptores empleados en cuestionarios validados con fines similares para otras Universidades (Barcelona (4), Salamanca (5 y Chile (6). Las respuestas se solicitaron en escala Liker (1 a 5), salvo en una pregunta en que se solicitó orden de priorización. En la encuesta se incluyó también una autoevaluación donde los estudiantes autocalificaron su propia memoria de trabajo a entregar para evaluación.

Análisis univariado. Las variables categóricas se expresan como frecuencias y porcentajes. Los porcentajes se compararon, según el caso, mediante la prueba de Chi-cuadrado (χ^2) o la prueba exacta de Fisher. Coherencia: Alfa de Cronbach. Utilizamos el alfa de Cronbach (7) para medir la consistencia interna de la encuesta.

3. RESULTADOS Y CONCLUSIONES

Los resultados mostraron que la autovaloración que tiene el estudiante de su trabajo depende en términos probabilísticos de la calificación real que ha obtenido y que lo que más les importaba de las prácticas de laboratorio era su aportación en la mejora de la nota final de la asignatura. Las valoraciones en general tanto de la metodología seguida como del aprendizaje adquirido fueron de un acuerdo considerable, independientemente de la calificación obtenida por cada estudiante. El estudio de coherencia con alfa de Cronbach mostró una consistencia interna aceptable para el conjunto de cuestiones referentes a la percepción de utilidad y aprendizaje. Se destaca que el estudiantado capaz de detectar una máxima relación entre teoría y prácticas fue el que obtuvo las mejores calificaciones, lo que lleva a plantear la importancia de una docencia integrada de todas las partes que conforman la asignatura (teoría, seminarios y prácticas). El estudio de coherencia con alfa de Cronbach ha mostrado una consistencia interna para el conjunto de estos ítems de 0,791 (0,696-0,862) de nivel aceptable, dando idea de que a todas estas preguntas (variables) subyace un factor que explica la percepción del aprendizaje adquirido en las prácticas. La distribución de las respuestas a los ítems sobre si esta actividad se adecuaba a los contenidos de la asignatura, si favorecía el autoaprendizaje y la adquisición de competencias profesionales y acerca del grado de satisfacción de las enseñanzas recibidas, también fue independiente (sin significación) al tercil de calificación real al que perteneciera cada estudiante. Estos ítems fueron en mayoría valorados con muestra de acuerdo de los encuestados.
Sin embargo, el análisis del ítem 2, que valoraba la posibilidad para los estudiantes de relacionar conceptos de teoría y prácticas realizando esta actividad, obtuvo una distribución de respuestas según su tercil por calificación real obtenida, casi significativa (P valor = 0,066). Los estudiantes que encontraron una máxima relación entre teoría y prácticas fueron los que obtuvieron las notas más altas. Probablemente sólo aquellos que han entendido bien la asignatura son capaces de ver esta relación.
Las encuestas son una herramienta para conocer las opiniones de los encuestados y obtener información, que tras su análisis puede ser empleada en implementar mejoras en la docencia. Sin embargo, cuando este tipo de estudios son sometidos a discusión, no es fácil encontrar investigaciones que evalúen conceptos, ya no solo que sean iguales, sino similares, debido a la amplitud en la variedad de encuesta e ítems a valorar.
Sin lugar a dudas, estos resultados nos acercan a conseguir una objetiva percepción del valor de las prácticas de laboratorio de una de las asignaturas de Seguridad Alimentaria impartida en el Grado de Veterinaria, que permitirán implementar las medidas necesarias para subsanar las deficiencias resaltadas en este estudio.

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Mejora de los resultados académicos mediante la tutorización entre iguales en los trabajos fin de master

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Palabras clave: Innovación docente, resultados académicos, trabajos fin de master, tutorización entre iguales.

EXTENDED ABSTRACT

1. INTRODUCIÓN

La tutorización entre iguales puede entenderse como la delegación de la función de tutorización en la figura del estudiante [1,2], siempre con la supervisión del profesorado. El Trabajo de Fin de Máster (TFM) es una asignatura que concluye con la titulación de Máster, en el que el alumno/a debe demostrar sus capacidades y habilidades en base a los conocimientos adquiridos. Tras hacer una evaluación de los modelos de tutoría más utilizados [2], se ha llegado a la conclusión de que el modelo más adecuado es el modelo de tutorización entre iguales. Sin embargo, para poder llevarlo a cabo será necesario que el estudiante que vaya a ejercer la figura de mentor/a, haya sido un estudiante que haya cursado ese título y que siga manteniendo una relación académica con el área de conocimiento que tutoriza el TFM, siendo natural que esta relación sea como doctorando/a.

El objetivo del presente trabajo es comprobar que la tutorización entre iguales consigue mejorar los resultados académicos de los estudiantes que realizan los TFM.

2. METODOLOGÍA

Se desarrolló la modalidad de tutorización entre iguales en los TFMs experimentales del alumnado que aceptó recibir un modelo de tutoría alternativo, desde el curso académico 2020/2021 al 2023/2024, del Máster en Seguridad y Calidad de los Alimentos de la Universidad de La Laguna (ULL), concretamente sobre los TFMs dirigidos por el profesorado del Área de Toxicología.

Cada alumno/a de TFM (mentorizado) fue asignado con un tutor-estudiante (o mentor/a). El tutor-estudiante debía ser alumno/a de doctorado del Área de Toxicología que, a su vez, fuera egresado de esta titulación de máster, ofreciendo una gran ventaja a este método pues conocen el Máster y sus características.

Se evaluaron los resultados obtenidos en base a la calificación de los TFMs y su comparación con los cursos anteriores (2013/2014 al 2019/2020). Además, se encuestó al alumnado tutorizado, para conocer su percepción sobre el desarrollo de la mentoría [3].

3. RESULTADOS Y CONCLUSIONES

En los TFM de estudio se obtuvieron calificaciones de notable (7-8) en un 33.3% de los casos y sobresaliente (9-10) en un 66.7% de los casos, lo cual supone una mejora de los resultados académicos respecto a años previos, en donde el 2% obtuvo una calificación de aprobado (5-6), el 36% obtuvieron notas de notable y el 56% de sobresaliente. Cabe destacar que la nota media de los trabajos también mejoró, pasando de 8.71 (notable) en el periodo 2013/2014 - 2019/2020, a 9.13 (sobresaliente) en el periodo 2019/2020 – 2023/2024. En general, las encuestas realizadas al alumnado mentorizado, mostraron la satisfacción con el proceso de mentoría (Figura 1). La mayoría de los estudiantes consideraron adecuado este modelo de tutoría para mejorar su calificación y como ayuda a conseguir los propósitos del proyecto profesional. Se valoró mucho la facilidad de contacto del estudiante con su mentor/a, y en la mayoría de casos el modelo de tutorización consiguió cumplir con las expectativas, pudiendo llegar a ser recomendado a otros compañeros.

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El proceso de tutorización llevado a cabo demostró la importancia de la tutorización entre iguales y su incidencia positiva en los resultados del alumnado y en su satisfacción, por lo que seguramente aumentará los estándares de calidad [4].

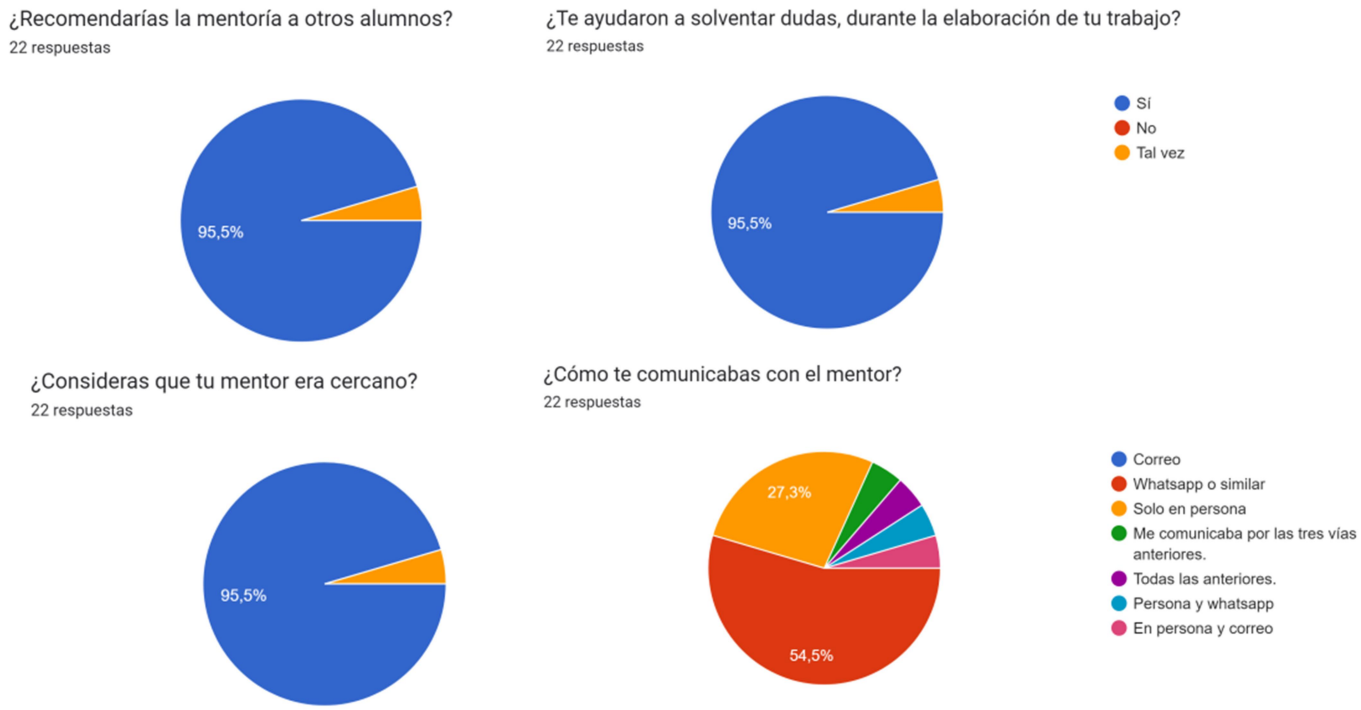

Figura 1. Resultados de las preguntas más relevantes de la encuesta.

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Análisis del impacto del aula invertida en estudiantes universitarios: una experiencia en la asignatura de Métodos de Decisión

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Keywords: aula invertida, rendimiento académico, evaluación continua, teoría de la decisión

1. INTRODUCCIÓN

Las metodologías de aprendizaje activas cada vez son más aplicadas en las aulas universitarias, lo que suscita la pregunta sobre su impacto en el aprendizaje y rendimiento académico de los estudiantes. Con este objetivo se estudia la implementación de la metodología *flipped classroom* (o aula invertida) en la asignatura de Métodos de Decisión del Grado en Marketing durante dos cursos académicos consecutivos. La existencia de dos subgrupos de matriculación para la misma asignatura permitió implementar esta metodología con la mitad de los alumnos (grupo de innovación) y mantener la metodología tradicional con el resto (grupo de control), con objeto de poder comparar los resultados académicos y las evidencias en la evaluación continua para verificar si efectivamente existen mejoras en el aprendizaje gracias al aula invertida. A la vista de la literatura existente, la idea de invertir el aula es una innovación metodológica interesante para lograr un aprendizaje más significativo, consiguiendo dinamizar el aula con una implicación activa y participativa de los estudiantes en su propio proceso de aprendizaje y fomentando también un estudio continuo que pueda conllevar a una mejora del rendimiento académico.

Este trabajo pretende contribuir a esa literatura al mostrar los principales resultados y conclusiones de la aplicación del enfoque *flipped classroom* en el proceso de enseñanza-aprendizaje de una disciplina relacionada con las ciencias sociales. El propósito del análisis de esta experiencia de innovación educativa, y del cambio metodológico que supone, es observar si existen evidencias de mejora en los logros académicos por parte de los estudiantes.

2. METODOLOGÍA

Para poder realizar la comparativa, y dado que para la misma asignatura existían dos subgrupos, se implementó la metodología de aula invertida en uno de ellos con la mitad de los alumnos (grupo de innovación) y se mantuvo la metodología tradicional expositiva con el otro subgrupo (grupo de control). Y dicha diferenciación se realizó durante la impartición de la asignatura en dos cursos académicos consecutivos.

Durante el periodo lectivo, los estudiantes realizaron una prueba de evaluación continua no eliminatoria que tenía un peso del 20% en la calificación final de estudiante. El objetivo de esta prueba era comprobar si efectivamente los estudiantes habían ido trabajando de forma continua y si habían asimilado los contenidos de la materia explicados hasta entonces siguiendo uno y otro enfoque en cada grupo. La prueba consistió en la resolución e interpretación de problemas y ejercicios teórico-prácticos sobre la Teoría de la Decisión y los métodos o criterios de decisión en incertidumbre y riesgo, estudiados hasta entonces. El 80% restante de la calificación fue una prueba final, en línea con el anterior, realizada al final del curso, fuera del periodo lectivo, y en el que se evaluaban todos los contenidos de la asignatura.

Para medir el posible impacto de la metodología de aula invertida en el rendimiento de los estudiantes se realizará un análisis exploratorio y comparativo de las calificaciones de la prueba de evaluación continua (PEC), de la prueba de evaluación final (FINAL) y de la Calificación resultante (media ponderada con un 20% para la PEC y un 80% para la FINAL) para los dos subgrupos (de control y de innovación) en dos cursos académicos consecutivos (2021/22 y 2022/23).

La evidencia científica consultada pone de manifiesto que la introducción de más aprendizaje activo en la educación superior mejora los logros académicos de los estudiantes [1, 2]. Sin embargo, en relación con los efectos del aula invertida sobre el rendimiento académico de los estudiantes universitarios, existen revisiones sistemáticas de la literatura que analizan su eficacia [3, 4, 5, 6, 7, 8] y que demuestran impactos positivos, aunque con un nivel de evidencia moderado.

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3. RESULTADOS Y CONCLUSIONES

Entre otras evidencias, para cuantificar el impacto que la metodología *flipped classroom* sobre el rendimiento académico se calcula el tamaño de efecto (TE), mencionado entre otros, en Prieto et al. [1]. Dicha medida es el resultado de dividir la diferencia que se observa entre el valor medio obtenido con la nueva metodología de aula invertida y el resultante de la metodología tradicional dividido del valor de la desviación estándar que se obtiene de dicha metodología tradicional. En la tabla 1 se muestran los resultados, tanto para las dos pruebas de evaluación y para la calificación de la asignatura, y para los dos cursos académicos consecutivos estudiados.

Tabla 1. Tamaño del efecto (TE)

Tamaño del efecto (TE)	2021/2022	2022/2023
Prueba de evaluación continua	0,67	0,58
Prueba final del curso	0,15	0,41
Calificación	0,43	0,54

En líneas generales, el tamaño del efecto es positivo en todos los casos. Puede observarse que el efecto es mayor en la primera prueba de evaluación (PEC) en ambos cursos y el tamaño en la prueba final (FINAL) es superior en el segundo curso en el que se puso en marcha la experiencia. Por tanto, finalmente, en términos globales, el tamaño del efecto en el rendimiento académico de los estudiantes se hace también mayor en el segundo curso de implementación.

En resumen, de las revisiones realizadas hasta la fecha puede determinarse que el impacto sobre el rendimiento académico es efectivamente positivo, como así se concluye también del análisis de la comparativa entre dos subgrupos (uno con metodología tradicional expositiva y otro de innovación con metodología de aula invertida) de una misma asignatura de Teoría de la Decisión en la rama de ciencias sociales. Si bien dicho impacto queda evidenciado de forma moderada (en línea también con lo que muestra la literatura existente), el análisis de esta experiencia demuestra que tras la implementación del aula invertida en varios cursos académicos las mejoras alcanzadas en los resultados académicos de los estudiantes se mantienen y tienden a ser mayores.

Como limitación y futura mejora cabe mencionar el análisis descriptivo realizado para la experiencia, que puede verse enriquecido con técnicas inferenciales de análisis de datos, con el objeto de estudiar la posible extrapolación de los hallazgos obtenidos.

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El valor didáctico de la saga *Assassin´s Creed*: lecciones de Historia para el siglo XXI, del videojuego al museo

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Palabras clave: Videojuegos educativos, Historia, Enseñanza, Aprendizaje, Assassin's Creed, Museos virtuales.

RESUMEN EXTENDIDO

1. INTRODUCCIÓN

El uso de videojuegos en la enseñanza ha evolucionado significativamente, especialmente en áreas como la Historia, donde permiten una representación dinámica e inmersiva de acontecimientos pasados. Títulos como Assassin's Creed se han destacado por su capacidad para ofrecer experiencias históricas detalladas, tanto desde el punto de vista visual como narrativo, convirtiéndose en recursos didácticos útiles en las aulas. Lejos de ser simples herramientas de entretenimiento, estos videojuegos han demostrado su potencial para involucrar al alumnado en procesos de aprendizaje más activos y participativos, ofreciendo una alternativa a los métodos tradicionales basados en la exposición teórica y la memorización de datos.

La inmersión en entornos virtuales como el Egipto ptolemaico, la Grecia clásica o la época de las invasiones vikingas permite al alumnado no solo estudiar estos periodos, sino también experimentarlos de manera directa, lo que facilita una comprensión más profunda de los eventos históricos. Además, el carácter interactivo de los videojuegos introduce un elemento lúdico que incrementa la motivación intrínseca, mejorando su implicación en el proceso educativo.

2. METODOLOGÍA

El diseño de propuestas didácticas debe responder a los objetivos de personalización del aprendizaje, la mejora del rendimiento académico y el fomento de competencias como la creatividad y la resolución de problemas. Aquí es donde entraría en juego el modelo TPACK, que ayuda a los docentes a pensar de manera estratégica sobre cómo combinar el contenido, la pedagogía y la tecnología de manera efectiva. Tres variables en las que cada docente debe formarse y en la que trabajar de forma combinada y no sectorizada; además, de tener muy presente el contexto educativo al que va dirigido y se aplica con el objetivo de que la acción docente sea eficaz. Su interrelación refleja que la forma de enseñar, los contenidos y la tecnología se encontrarían en simbiosis

Nuestra propuesta se basa en la incorporación de videojuegos como la saga que nos ocupa, bajo la supervisión activa del docente. Este enfoque no solo busca aprovechar su valor lúdico, sino también sus capacidades pedagógicas para desarrollar competencias clave en el alumnado, como el pensamiento crítico, la resolución de problemas y la toma de decisiones en contextos históricos.

Su empleo sigue un proceso estructurado que incluye varias fases. Primero, el alumnado se enfrenta a la inmersión en el entorno virtual y a la toma de decisiones en tiempo real durante la partida. Tras esta experiencia, se promueve una fase de reflexión en la que deben analizar los acontecimientos vividos en el juego. En este punto, el profesorado tiene un rol decisivo y fundamental al guiarles en la interpretación y evaluación crítica de los hechos históricos representados en el relato gráfico de las pantallas, ayudándoles a diferenciar entre los elementos de ficción y la recreación fiel de los acontecimientos.

Este proceso metodológico asegura que los videojuegos no sean utilizados únicamente como recursos de entretenimiento, sino como herramientas que complementan la enseñanza formal. La fase de reflexión posterior es clave, ya que permite al alumnado profundizar en los conocimientos adquiridos, comparando la experiencia vivida en el juego con el análisis crítico de los hechos históricos.

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3. CONCLUSIONES

Los videojuegos, cuando se integran adecuadamente en el entorno educativo, ofrecen una forma innovadora y efectiva de enseñar Historia. Los beneficios incluyen una mayor motivación del alumnado, una experiencia de aprendizaje más activa y la posibilidad de acceder a reconstrucciones detalladas de contextos históricos que, de otra manera, serían difíciles de visualizar o experimentar en el aula. Títulos como Assassin's Creed destacan por su capacidad para ofrecer recreaciones precisas de monumentos y lugares históricos, convirtiéndose en auténticos "museos virtuales".

Sin embargo, debemos ser conscientes de los desafíos que presentan. Es fundamental que el docente mantenga un equilibrio entre el enfoque lúdico y el rigor académico. Aunque los videojuegos pueden captar la atención del alumnado y hacer que el aprendizaje sea más atractivo, su implementación debe estar siempre alineada con los objetivos educativos y contenidos curriculares. Además, es necesario evitar que el componente de ocio predomine sobre los aspectos pedagógicos, asegurando que el aprendizaje sea estructurado y profundo.

Tienen el potencial de transformar la enseñanza de la Historia, pero su éxito depende en gran medida de cómo se integren en el aula y de la orientación pedagógica que el o la docente proporcione durante el proceso de enseñanza-aprendizaje.

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Técnicas avanzadas de diagnóstico por imagen, gamificación y vídeos didácticos en sesiones prácticas del Grado en Veterinaria: Percepción de los estudiantes

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1. INTRODUCCIÓN

La formación de los futuros veterinarios no es ajena a las nuevas tecnologías. El desarrollo de técnicas biomédicas novedosas de imagen ha propiciado el conocimiento, en mayor profundidad, de gran diversidad de estructuras anatómicas contribuyendo en el desarrollo de la Anatomía Veterinaria de gran variedad de especies animales [1,2]. De igual manera, las nuevas tecnologías están propiciando cambios metodológicos en la docencia del Grado en Veterinaria haciendo que los estudiantes puedan desarrollar las competencias y las habilidades necesarias para el desarrollo de su actividad profesional. Por otro lado, a pesar de que las clases prácticas siguen siendo un componente fundamental en la enseñanza veterinaria, hay ocasiones en que estas sesiones pueden no generar suficiente interés o presentar desafíos para los estudiantes. Esta falta de interés puede contrarrestarse mediante la introducción de nuevas tecnologías de aprendizaje en las clases prácticas, como la gamificación o los vídeos educativos. En casi todos los niveles educativos, la gamificación se ha utilizado como un vehículo para la enseñanza de conceptos, al tiempo que aumenta la motivación de los estudiantes [3]. Por lo tanto, este estudio tuvo como objetivo evaluar la percepción de los estudiantes sobre la introducción de técnicas avanzadas de diagnóstico por imagen, gamificación y videos docentes en las sesiones prácticas de Anatomía Veterinaria, Enfermedades Parasitarias y Epidemiología, respectivamente.

2. METODOLOGÍA

El presente estudio, enmarcado en el Proyecto de Innovación Educativa con referencia PIE 2023-80 de la Universidad de Las Palmas de Gran Canaria (ULPGC).

La población objeto de estudio fueron los estudiantes matriculados en las asignaturas de Epidemiología, Anatomía Veterinaria y Enfermedades Parasitarias que se imparten en el Grado en Veterinaria de la ULPGC en el curso académico 2023/2024, diseñándose un muestreo no probabilístico de voluntarios. Se utilizaron videos docentes en las clases prácticas de Epidemiología. En las sesiones prácticas de Anatomía Veterinaria, los métodos de enseñanza tradicionales (disección de especímenes cadavéricos y libros de texto) se implementaron con imágenes de tomografía computarizada (TC) y reconstrucciones tridimensionales. Las sesiones prácticas de Enfermedades Parasitológicas se implementaron con Kahoot®, una herramienta de aprendizaje basada en juegos. Con el objetivo de evaluar la percepción de los estudiantes sobre la introducción de videos educativos, técnicas avanzadas de diagnóstico por imagen y gamificación en las sesiones prácticas de Epidemiología, Anatomía Veterinaria y Enfermedades Parasitarias, se elaboraron tres cuestionarios teniendo en cuenta encuestas de satisfacción previamente validadas por el equipo de investigación [4]. Las variables incluidas en estos cuestionarios se cuantificaron utilizando una escala de Likert de cinco valores ordinales; “totalmente en desacuerdo” (1), “en desacuerdo” (2), “ni de acuerdo ni en desacuerdo” (3), “de acuerdo” (4) y “totalmente de acuerdo” (5).

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3. RESULTADOS Y CONCLUSIONES

Los resultados reflejados en el presente trabajo de innovación educativa han puesto en evidencia la percepción de los estudiantes sobre la utilización de videos docentes, técnicas avanzadas de diagnóstico por imagen y gamificación en las sesiones prácticas de tres asignaturas que se imparten en el Grado de Veterinaria de la ULPGC.

Un total de 135 estudiantes completaron la encuesta, de los cuales 51 fueron estudiantes de Epidemiología, 35 de Anatomía Veterinaria y 49 de Enfermedades Parasitarias. Estos números corresponden con el 70,8%, 93.7% y 90.7 % de los estudiantes matriculados en las asignaturas de Epidemiología, Anatomía Veterinaria y Enfermedades Parasitarias, respectivamente.

Cuando se procede a agrupar los resultados con valor 4 y con valor 5 de la escalada de Likert como respuestas afirmativas y como respuestas negativas los resultados con valor 1 y con valor 2, no se encuentran diferencias estadísticamente significativas en las contestaciones en la mayoría de las preguntas al comparar sus porcentajes por asignatura (Figuras 2, 3 y 4). La única pregunta que presenta una diferencia estadísticamente significativa en las respuestas de los alumnos de Epidemiología al compararlas con las otras dos asignaturas es la pregunta 2 (P2). Sobre si el diseño de la práctica les ha motivado, en Epidemiología solo un 45,1% de los alumnos contesta afirmativamente, contrastando con el 80% de Anatomía Veterinaria y el 75,5% de Enfermedades Parasitarias, teniendo unos p-valores del 0,0013 y 0,002, respectivamente. No se observan diferencias estadísticamente significativas entre las respuestas de Anatomía Veterinaria y Enfermedades Parasitarias. Por otro lado, también se encuentra otra diferencia estadísticamente significativa ($p=0,0024$) al comparar los porcentajes de las respuestas a la pregunta 6 (He podido seguir sin problemas la actividad) entre los alumnos de Anatomía Veterinaria y los de Enfermedades Parasitarias. Los porcentajes de contestaciones afirmativas fueron del 77,14% y del 98%, respectivamente.

Para la mayoría de los participantes, los vídeos docentes, las técnicas avanzadas de diagnóstico por imagen y el Kahoot®, utilizados en las sesiones prácticas de las asignaturas de Epidemiología, Anatomía Veterinaria y Enfermedades Parasitarias, respectivamente:

- Han hecho que el desarrollo de las sesiones prácticas sea más entretenido.
- Les han permitido participar de manera más activa en su proceso de aprendizaje.
- Les ha fomentado su aprendizaje autónomo.
- Han sido herramientas útiles para la adquisición de nuevos conocimientos
- Han repercutido positivamente en la calidad de las sesiones prácticas

Por todo ello, la mayoría de los estudiantes que participaron en el presente estudio han recomendado el uso de estas herramientas en otras sesiones prácticas del Grado en Veterinaria.

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¿Qué aprendemos de "lo femenino" con juegos didácticos de mesa de literatura y arte? Análisis crítico del discurso y Ecologías de aprendizaje para una Matriz de Datos en la ES

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RESUMEN

En este estudio se traza un análisis del paratexto de una muestra paradigmática de juegos didácticos de mesa del ámbito de la Literatura y el Arte. Se fundamenta en la conceptualización del Análisis crítico del discurso y de las Ecologías de Aprendizaje. Persigue identificar los juegos de mesa como auténticos micro eventos comunicativos, documentar, desde su estructura temática (textual y sobre todo paratextual), la infrarrepresentación de "lo femenino", contextualizar la investigación desde las necesidades del profesorado en formación y categorizar la muestra de juegos en una matriz de datos. El universo lo componen cinco juegos temáticos: cuatro de naipes o cartas y uno del tipo rompecabezas (integra puzle y libro). Académicamente se contextualiza en el proceso instructivo del Máster del Profesorado. Las conclusiones, al hilo de las necesidades formativas del colectivo docente, y en atención al DUA, son que estos juegos contribuyen a la reflexión metalingüística (por su condición de materiales auténticos), impulsan las habilidades comunicativas blandas, pero trasladan un diseño e *input* cultural que precisa de una revisión crítica, al hilo de los estereotipos y sesgos detectados en la representación paratextual de lo femenino.

Palabras clave: juegos de mesa de literatura y arte, materiales auténticos, paratexto, Matriz de Datos

1. INTRODUCCIÓN

Desde que Huizinga [1] postulara con su ya mítica defensa del Homo ludens la relevancia del juego y su vínculo con "lo cultural", el juego en general tiene un sitial privilegiado en el ámbito educativo. En este artículo se transita por el juego de interior, por los juegos de mesa temáticos. En el contexto contemporáneo, estos han experimentado un auge que ha mostrado su recorrido por una senda natural: de la casa a otros ámbitos vitales, de intervención, cuidado y apego [1] [2].

El juego de mesa se ha ido reivindicando como un instrumento versátil, unas veces recurso concreto, complementario de contenidos específicos, y otras procedimiento o estrategia, acicate en el ecosistema comunicativo de las interacciones humana. En el ámbito investigativo se han analizado sus avances en la aplicación a determinadas disciplinas[3] y se ha analizado su oportunidad pedagógica en el terreno de las funciones ejecutivas que se activan al jugar [4].

Ahora bien, menos investigado ha sido su repercusión en el terreno de los referentes sociales y culturales que se transmiten desde su adscripción temática y por tanto desde su discurso paratextual: ¿qué modelo de "lo femenino" aprendemos con ellos? La motivación por proponer el juego de mesa como material alternativo para el aula, se fundamenta, por un lado, y como material auténtico que es, en las *Ecologías de Aprendizaje* [5] [6] que defienden la capacidad de aprender con todo tipo de materiales y en todo tipo de contextos. Por otro lado, se alinea con postulados del *Análisis crítico del discurso* o CDA [7], que determinan la influencia del lenguaje y de los mensajes en general (en su complejidad textual y sobre todo paratextual), en los contextos empresarial, publicitario y académico, entre otros. Este artículo subraya desde el modelo paradigmático de cinco juegos de mesa, la necesidad de revisar su narrativa textual y paratextual como un cuestionamiento a la realidad sociocultural, infrarrepresentada en unos casos y sesgada en otros, de lo femenino, en los dos ámbitos de referencia de los juegos didácticos analizados: la literatura y el arte. Desde una matriz de datos se registra comparativamente el perfil de lo femenino, tanto en referentes reales (la nómina de mujeres creadoras, artistas de la pintura, en tres juegos relacionados con el arte), como en modelos de ficción, concretamente en personajes de la cuentística y del mundo de las marionetas.

2. MARCO TEÓRICO

2.1. Del ocio al aula: los juegos de mesa como material auténtico y una respuesta al DUA

El uso de juegos de mesa modernos se inserta dentro de la metodología (genérica) del aprendizaje basado en juegos (ABJ), de gran provecho en todas las etapas educativas. Desde la perspectiva de las *Ecologías de Aprendizaje* se incorporan al aula universitaria sumando ventajas: aprovechando *a priori* su evidente atractivo, rentabilizando su estatus privilegiado de material auténtico y, finalmente, mejorando las funciones ejecutivas devenidas de su desempeño. Su inclusión en el aula universitaria, especialmente en el contexto de la instrucción a futuro profesorado, da respuesta efectiva a la consigna del DUA de la diversidad por bandera. Con su incorporación en el aula se atienden los tres principios que regulan el DUA: representación, acción/expresión e implicación.

2.2. El juego de mesa desde el CDA: micro evento comunicativo con mucho que decir

El juego de mesa contribuye a tejer toda una arquitectura discursiva pues comporta un recorrido por las funciones ejecutivas: jugar implica conversar, ceder, debatir, convencer, seducir, gesticular, contenerse o bien enfadarse, anticiparse al otro y ensayar estrategias, etc. El momento del juego es así un micro evento comunicativo que integra palabra hablada y comunicación no verbal. Sin embargo, interesa en esta investigación especialmente advertir la reacción ante el metadiscurso, a nivel de paratexto, que se localiza en los juegos seleccionados. ¿Cómo se responde y actúa ante la ambientación "estética" que incorpora el juego temático? ¿Qué imágenes sesgadas de los perfiles humanos -cuando se instalan en la mímesis de la

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realidad o de lo humanoide- se ofrecen? Los juegos aquí seleccionados muestran una desigual fotografía social en el ámbito de los referentes culturales femeninos, tanto en modelos reales de mujer como en los ficcionados. Se incurre en los temidos estereotipos y roles de género que tanto perjudican la cultura coeducativa.

3. MARCO METODOLÓGICO

Se trata de un estudio cualitativo, descriptivo, documental. A partir de una selección (muestreo no probabilístico) de n = 5 juegos de mesa, 2 del ámbito literario y 3 del arte, se aplica una matriz de datos para sistematizar sus componentes mediante una comparativa categorizada. La tipología de la muestra es intencional y se seleccionó de acuerdo a unos criterios. Los objetivos son: (1) Identificar los juegos de mesa como auténticos micro eventos comunicativos.(2) Abordarlos desde su estructura temática (narrativa textual y sobre todo paratextual) para determinar o no la infrarrepresentación de lo femenino (3) Contextualizar la investigación desde las necesidades del profesorado en formación y (4) Categorizar la muestra en una matriz de datos susceptible de replicarse a otras unidades. La matriz (Tabla 1) analiza el universo paratextual desde la comparativa de las unidades seleccionadas (eje horizontal) y las variables que inciden (eje vertical).

Tabla 1.Matriz de datos del análisis del paratexto de la muestra de juegos

	Estatus (a)		Referente (b)		Sesgo de edad (2) (c)				Sesgo de aspecto (3) (d)		Sesgo geográfico (Procedencia) (4) (e)	
					Joven		Adulta/Vieja					
	Percepción Invisibilidad (0)	Infrarrepresentación (1)	Real	Ficcionado	Aparentemente desvalida	Libre	Perversa/ Frívola	Buena	Caucásica: rubia, castaño claro, pelirroja	Morenas y Otros	Europa Central/ Europa Mediterránea	Otros
The Muppets 32 cartas; 8 familias	X	2 /8		2		1	1F		2R			
Arte 25 parejas de cartas/ tarjeta	X	4/25	4								3 EC	1(Rusia)
Similo Fábulas 30 cartas		13/30		13	6	1	5P	1 B	2R/2P 1 C	4 + 4		
Artists 40 cartas	X	5/40	5								1 EM	2 (USA 1 (Japón) 1 (Méx.)
Cuadros famosos 12 miniat. (lámina y libro)	X	1/12	1								1 EC	
Modelos totales		25/115	10	15	6	2	5/1	1	4/2/1	8	5	5
					8		7		15			

4. DISCUSIÓN Y CONCLUSIONES

Urge la necesidad de educar a quienes consumen juegos (jugadores transversales en la línea del lector transversal) capaces de interactuar con el juego y detectar las desigualdades que laten, a veces muy sutilmente, en su constelación paratextual. Se comprueba que la implementación de estos juegos de mesa cumple con varios de los puntos de verificación de los tres principios del DUA: comunicar desde lo motivacional, desde lo multimodal y desde lo metacognitivo.

Respecto a su integración en el ámbito educativo ante el conjunto de fortalezas evidenciadas, algunos autores [8] fueron más allá reivindicando su absoluta transversalidad. La conceptualización de lo femenino ha constatado su infrarrepresentación. Ha puesto de manifiesto la necesidad de revisar los materiales del aula. El docente puede ser la pieza clave que, en el acompañamiento del juego, comparta ese interrogarse por los motivos por los que a veces desaparece lo femenino y parece, en algunos juegos, "que la mujer no pinta nada".

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Aprendizaje cooperativo en Arquitectura y Bellas Artes. La formulación de PIELAGO: Proyecto de Innovación Educativa Laboratorios de Aprendizaje Grupal Orientado

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Keywords: metodologías activas; aprendizaje cooperativo; participación; construcción colectiva

RESUMEN EXTENDIDO

1. INTRODUCCIÓN

Se presenta la formulación de una propuesta que nace de la colaboración entre docentes y alumnado de la Escuela de Arquitectura de la Universidad de Las Palmas de Gran Canaria y de la Facultad de Bellas Artes de la Universidad de La Laguna. La propuesta parte de la constatación de que tienden a darse en el aula procesos y situaciones de aprendizaje no deseables, como la excesiva individualización, la falta de implicación en el ciclo de conocimiento, o cierta pasividad marcada por el predominio del eje docente-estudiante, que deja caer en el lado docente la mayor responsabilidad de la marcha del curso. Frente a ello se plantea la hipótesis de que es posible diseñar un modelo de asignatura basado en una aproximación metodológica capaz de incrementar la implicación del alumnado, así como la vinculación con los contenidos y generar actitudes frente al aprendizaje tendentes a interiorizar su condición colectiva, primando la relación horizontal entre estudiantes y la producción cooperativa de conocimiento. El proyecto PIELAGO es el resultado de la elaboración de una hipótesis en esta dirección, que comenzará su andadura con dos asignaturas, una por titulación, y el segundo año ampliará su aplicación a otras materias.

2. METODOLOGÍA

La hipótesis de partida se apoya en una serie de evidencias que conciernen a los siguientes aspectos:

- La primera es de carácter cualitativo, y se refiere a las actitudes percibidas por parte de un sector del alumnado frente a los procesos de aprendizaje.
- Por otro lado, partimos también del dato de que al menos una tercera parte de la clase tiende a adoptar roles poco o muy poco participativos; así como el hecho de que las calificaciones sobresalientes son muy escasas.
- Por último, al concluir la asignatura se dedicó parte de una de las sesiones finales a una sesión de evaluación colectiva de la misma por parte del alumnado, en la que se destacaron aspectos de distinto tipo, pero que en algunos casos denotaban la conveniencia de revisar el enfoque y el rigor metodológico.

A partir de estas informaciones y percepciones, se indaga cuáles son los problemas raíz de los que deriva la situación. Desde ambas titulaciones, Arquitectura y Bellas Artes, se detecta que los planteamientos educativos convencionales, combinados junto a otros factores, contribuyen a conducir al alumnado a:

- una baja implicación en el ciclo de conocimiento, excesivamente dependiente del/la docente;
- una baja participación en clase, con la salvedad de determinados perfiles de estudiantes;
- adquirir una baja percepción de la utilidad de la asignatura, en un contexto que en ocasiones es de competencia entre asignaturas por el tiempo del estudiante, una pugna en la que terminan primando las más exigentes;
- y, por último, una escasa cooperación entre estudiantes en el proceso de enseñanza-aprendizaje.

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A partir de ahí se concibió la posibilidad de rediseñar el planteamiento docente mediante la adopción de metodologías activas que propicien la implicación del alumnado en procesos de construcción colectiva de conocimiento y aprendizaje cooperativo y, en lo posible, vinculándolo a situaciones reales del desempeño profesional frente a retos de actualidad.

Todo ello se articulará en un plan para la recopilación y análisis de datos, cuyos resultados serán asimismo devueltos a la clase para reorientar y continuar el trabajo. El proyecto presta especial atención a su impacto en competencias transversales, particularmente su incidencia en fomentar el pensamiento crítico y la resolución de problemas en entornos colaborativos.

3. RESULTADOS Y CONCLUSIONES

De todo el proceso de análisis y reflexión realizado resultó la puesta en marcha de la formulación de un proyecto de innovación que terminó recibiendo el nombre de PIELAGO, acrónimo de Proyecto de Innovación Educativa Laboratorios de Aprendizaje Grupal Orientado. El proyecto pone de este modo el foco en el carácter experimental y piloto, en el enfoque grupal de los procesos de aprendizaje y en su orientación cooperativa y colaborativa. Fue presentado y seleccionado en la Convocatoria de Proyectos de Innovación Educativa 2024, lanzada de forma conjunta por la Universidad de Las Palmas de Gran Canaria y la Universidad de La Laguna (Tenerife), y será llevado a cabo por un equipo que integra tanto a personal docente de ambas universidades como a estudiantes de grado y posgrado. Comenzará por aplicarse en dos asignaturas, Crítica de la arquitectura, 4,5 ECTS, obligatoria de 4º curso, 2º sem. del Grado de Arquitectura (ULPGC), y Taller integrado de edición y obra múltiple, 6 ECTS, obligatoria de 4º curso, 2º sem. del Grado de Bellas Artes (ULL). En función del primer año, se aplicará en el segundo, total o parcialmente, a otras cinco asignaturas. La propuesta contribuye a mostrar la viabilidad de formular planteamientos educativos innovadores en titulaciones todavía no suficientemente transitadas por las metodologías activas y cooperativas de aprendizaje.

El proyecto apuesta por metodologías docentes que refuerzan la adquisición de habilidades y actitudes tendentes a la autonomía, la construcción colectiva y cooperativa de conocimiento y el pensamiento crítico. Hace énfasis en la adquisición de capacidades para la reflexión crítica, la comprensión y el análisis y/o abordaje de proyectos llamados a interactuar con realidades complejas. En la vertiente práctica de las asignaturas se trabajará explícitamente desde los marcos teóricos de la igualdad de género interseccional, los cuidados, la ecología y los límites planetarios, la justicia social y las propuestas decoloniales. Igualmente se tomará la referencia de los Objetivos de Desarrollo Sostenible, si bien, en coherencia con lo anterior, no de forma acrítica sino desde el análisis de sus aciertos, limitaciones y contradicciones. En particular, se estima que, al menos, tanto la perspectiva de género como la perspectiva socio-ecológica aplicadas a la arquitectura, el arte y la ciudad y el territorio, se prestan a ser incorporadas. En lo que se refiere a la implicación de estas orientaciones en el contexto de Bellas Artes resulta clara y central en cuanto este campo de conocimiento se centra en la construcción de imaginarios que definirán los marcos simbólicos de la experiencia social.

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Intervención para la mejora de la motivación del alumnado de primero de ciclo formativo de grado básico

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Keywords: motivación, simulador, gustos, intereses

RESUMEN EXTENDIDO

1. INTRODUCCIÓN

El presente artículo está basado en una intervención educativa [1] desarrollada en el marco de un Ciclo Formativo de Grado Básico en Informática y Comunicaciones, específicamente en el módulo de "Instalación y Mantenimiento de Redes para Transmisión de Datos" en un instituto de Educación Secundaria Obligatoria. La intervención surgió tras detectar la falta de motivación e interés del alumnado hacia el aprendizaje. Ante esta situación, se establecieron objetivos que buscaran no solo enseñar los conceptos teóricos, sino también adaptar las metodologías para motivar al alumnado, empleando dinámicas prácticas, colaborativas y centradas en sus gustos e intereses.

Entre las metodologías implementadas se incluyeron actividades colaborativas, el uso de simuladores de redes (Cisco Packet Tracer [2]), y la creación de actividades lúdicas y prácticas, que integraran ejemplos cercanos a la vida cotidiana del alumnado. Para ajustar las actividades a sus intereses, se diseñaron dos cuestionarios: uno para conocer sus gustos e intereses, y otro para medir su grado de satisfacción tras una de las actividades.

2. METODOLOGÍA

La intervención se basó en actividades dinámicas que se desarrollaron a lo largo de varias sesiones. El diseño de las actividades fue guiado por los resultados de una encuesta inicial de "gustos e intereses", que permitió personalizar el contenido para que fuera más relevante y atractivo para el alumnado.

Las actividades incluyeron:

- Exploración teórica de topologías de redes mediante un vídeo explicativo, con pausas estratégicas para mejorar la atención y retención de la información.
- Trabajo colaborativo mediante la creación de un mural sobre topologías de redes, con el objetivo de fomentar habilidades de trabajo en equipo. Al finalizar, se realizó un Kahoot compuesto de preguntas relacionadas con el temario de la actividad 1 y la actividad colaborativa.
- Las redes en nuestra vida, una actividad que conectaba las topologías de redes con las aficiones del alumnado, como la música o los videojuegos.
- Práctica guiada e individual con Cisco Packet Tracer, que permitió al alumnado aplicar de forma práctica los conceptos teóricos en un entorno simulado.

El análisis de los resultados se realizó mediante un test de Wilcoxon [3] para evaluar las diferencias en el rendimiento académico antes y después de la intervención, y también a través de una encuesta de satisfacción para capturar las percepciones cualitativas del alumnado sobre una de las actividades.

3. RESULTADOS Y CONCLUSIONES

Los resultados de la Encuesta de Satisfacción mostraron una valoración positiva en relación con los ejemplos utilizados, la conexión entre la teoría y la vida cotidiana, y el entretenimiento de las actividades. La mayoría del alumnado consideró

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que los ejemplos utilizados eran "Buenos" o "Muy buenos" y que las actividades habían mejorado su comprensión de los temas tratados. Además, el uso de ejemplos cercanos a sus intereses personales contribuyó a mantener la motivación en el aula.

En cuanto a las notas académicas, el test de Wilcoxon no mostró una diferencia estadísticamente significativa en el rendimiento del alumnado tras la intervención. Sin embargo, las observaciones cualitativas indicaron un aumento en el interés y la participación del alumnado, especialmente en la práctica con Cisco Packet Tracer, que fue valorada como una herramienta útil para conectar la teoría con situaciones reales.

Las principales conclusiones extraídas de la intervención son las siguientes:

- El alumnado mostró una mejor comprensión de las topologías de red y una mayor implicación en las actividades prácticas, gracias a la personalización de los contenidos.
- El uso de Cisco Packet Tracer fue fundamental para proporcionar una perspectiva práctica de los conceptos teóricos.
- A pesar de las dificultades iniciales, el trabajo colaborativo logró que el alumnado participara activamente y desarrollara habilidades interpersonales.
- La motivación y el compromiso del alumnado fueron evidentes en las actividades diseñadas, lo que refuerza la importancia de seguir adaptando las metodologías a sus intereses y necesidades.

Las limitaciones en la evaluación, como la baja asistencia, impidieron obtener una valoración justa y precisa de los resultados, aunque se considera que, en un periodo más largo, las metodologías aplicadas podrían haber generado un impacto mayor. Por ello, se recomienda seguir utilizando encuestas de satisfacción para capturar el impacto cualitativo, continuar refinando las metodologías activas y desarrollar estrategias de apoyo individualizado para incluir mejor al alumnado con necesidades educativas especiales (NEAE) [4].

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Propuesta de aprendizaje para el estudio comparativo de la huella de carbono y ecológica en el ciclo de vida aplicado a sistemas de depuración natural y convencional en efluentes con alta carga orgánica

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Keywords: depuración, huella de carbono, huella ecológica, Simapro.

EXTENDED ABSTRACT

En este estudio se presenta una propuesta educativa dirigida a estudiantes de ingeniería, en la cual se les enseña a calcular y optimizar diversos parámetros, como la huella de carbono y la huella ecológica, a lo largo del ciclo de vida de un sistema de depuración natural, comparándolos con los de un sistema de depuración convencional. Para ello, se emplea un software de modelización especializado. La propuesta formativa se centra en la comparación de la huella de carbono de ambos tipos de sistemas de depuración, lo cual puede extrapolarse a otros tipos de sistemas de tratamiento de aguas. El propósito es integrar este enfoque en las actividades formativas prácticas dentro del marco de los programas de Grado y/o Máster Universitario en ingeniería industrial. La aplicación del software *SimaPro* permite simular el ciclo de vida y calcular la huella de carbono de sistemas de depuración natural, incorporando diversas variantes. Esta herramienta resulta fundamental tanto para el diseño como para la optimización de estos sistemas, ya que ofrece la flexibilidad de ajustar los diseños según las necesidades del estudiante o docente. Este enfoque metodológico facilita la comprensión y el aprendizaje de los objetivos planteados en el proceso formativo.

INTRODUCTION

La actividad propuesta se centra en el desarrollo de tecnologías educativas de simulación y modelización para la consecución de soluciones que puedan ser implementadas de forma específica en el ciclo de recursos para mejorar las interrelaciones entre los aspectos de Cambio Climático, Agua, Energía y Alimentos, mediante el análisis de sistemas de depuración y regeneración [1]. Esta evaluación incluye el análisis del ciclo de vida (ACV) [2], la huella de carbono, los impactos ambientales y la capacidad de mitigación, con el fin de identificar las tecnologías más apropiadas en función de diferentes contextos [3]. La iniciativa de aprendizaje está dirigida principalmente a estudiantes de tercer y cuarto año de Grado en Ingeniería, aunque, debido a su potencial, también puede ser extendido a estudiantes de Máster y/o Doctorado.

El objetivo del aprendizaje es que los estudiantes adquieran una comprensión profunda de cómo las configuraciones y las variables de diseño y funcionamiento influyen en el diseño, la durabilidad y el cumplimiento de la normativa vigente, así como en el desempeño de los ACV[4] aplicados a los sistemas de depuración. Los conocimientos impartidos están alineados con los objetivos del programa académico de la asignatura, los complementan y los amplían. En particular, los estudiantes deben familiarizarse con los principios fundamentales del diseño modelización y simulación matemática [5] así como, el funcionamiento de los sistemas de depuración, tanto naturales como convencionales. En estos procesos es posible simular de forma matemática los procesos biológicos que concurren [6], así como con el ciclo de vida de estos sistemas y el cálculo de sus huellas de carbono y ecológica. Numerosos autores como [5,7], discuten los beneficios y desafíos del uso de tecnología de simulación en la enseñanza de las matemáticas, enfatizando cómo la interpretación crítica de los resultados es clave para el aprendizaje profundo y como puede mejorar la comprensión de conceptos matemáticos de simulación, pero subraya la necesidad de interpretación crítica y de sentido en los resultados obtenidos.

El objetivo principal de este Análisis de Ciclo de Vida (ACV) [4] es estimar el impacto ambiental asociado al ciclo de vida de un sistema de tratamiento de depuración natural. Como caso de estudio, se utilizará el sistema encargado del tratamiento de los vertidos generados en el municipio de Santa Lucía de Tirajana, con una capacidad para 500 habitantes equivalentes. El ACV se llevará a cabo de manera integral, abarcando todas las etapas del ciclo de vida, desde la adquisición de los materiales necesarios para la construcción de la planta hasta las fases de operación y mantenimiento de esta.

METHODOLOGY

Para el correcto desarrollo de la metodología de ciclo de vida (ACV) es preciso utilizar una herramienta de software que permita ahorrar tiempo y lograr resultados fiables. La función básica de estos es realizar los balances de materia y energía sobre el proceso específico y asignar las emisiones, usos de energía, etc., normalizados sobre una base común. En este caso, se utiliza la herramienta SimaPro versión 9.1.1.

Para este ACV, se trabaja con la base de datos más oportuna la Ecoinvent v3.7.1 ya que es una mejora de las bases de datos BUWAL 250 y la ETH, cuenta con más de 4000 procesos pertenecientes a diferentes sectores.
La metodología empleada en el estudio es la ILCD 2011 puesto que será la metodología de referencia para las Huellas ambientales de la Unión Europea, siendo las categorías de impacto las que se muestran a continuación: cambio climático, agotamiento de la capa de ozono, ecotoxicidad para ecosistemas de agua dulce. toxicidad humana (efectos cancerígenos), partículas inorgánicas con efectos respiratorios, radiaciones ionizantes, efectos sobre la salud humana, formación fotoquímica de ozono, acidificación, eutrofización terrestre, eutrofización acuática, ecotoxicidad de agua dulce, agotamiento de los recursos (agua, minerales, fósiles), transformación de la tierra.

Así mismo, cabe destacar que para el cálculo de la huella de carbono se utiliza la metodología IPCC 2013.

RESULTS AND CONCLUSIONS

El análisis del ciclo de vida (ACV) es una metodología utilizada para evaluar el impacto ambiental de productos o servicios a lo largo de todas sus etapas, desde la extracción de materias primas hasta su disposición final. Para ello, es posible utilizar herramientas de simulación matemática similares a las aplicadas en contexto industrial [7,8]. En el contexto educativo, enseñar a los estudiantes a utilizar un software de cálculo de ACV les permite aplicar principios de sostenibilidad y análisis cuantitativo de manera práctica.

El ACV es una metodología general que puede aplicarse parcialmente según el nivel de detalle requerido por los objetivos propuestos. Existen tres diferentes tipos de ACV: el conceptual, el simplificado y el completo. El primero de ellos, se trata de un estudio cualitativo cuya función es identificar los impactos más significativos de forma muy genérica. El segundo tipo, realiza un ACV más completo centrándose en las etapas más importantes y analizando los datos que se consideren más importantes. El último de ellos es el más complejo ya que se basa en un análisis completo en detalle, teniendo en cuenta los impactos, etapas e inventario tanto a nivel cualitativo como cuantitativo.

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Implementación de visión por computador en robots colaborativos para control de calidad industrial: Una Práctica de Laboratorio

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Keywords: Práctica de laboratorio, OpenCV, programación de robots, robot UR5.

RESUMEN EXTENDIDO

1. INTRODUCTION

La llegada de los robots colaborativos o *cobots* a la industria ha supuesto un gran cambio de paradigma en la ejecución de los procesos industriales. Cada vez es más frecuente que estos *cobots* trabajen en entornos industriales de forma colaborativa con los humanos, compartiendo un entorno físico y colocando en primer plano la seguridad del personal [1].

Estos sistemas robóticos utilizan a menudo sensores para monitorizar el entorno. Un buen ejemplo es la inclusión de cámaras que, mediante la visión por computador, permiten identificar elementos en la zona de trabajo del robot e indicar su posición y orientación. Con esta información, el robot puede ser programado para realizar diversas tareas con dichos elementos, como detectar y clasificar piezas defectuosas.

La complejidad en la implementación de un sistema de estas características radica principalmente en la visión por computador y en la programación de robots. Una de las mejores formas de introducir al alumnado en estos campos es a través de la realización de prácticas de laboratorio [2].

En este artículo se describe un equipo que simula un proceso de control de calidad industrial en el que se detectan tornillos con defectos de fabricación mediante una cámara y son eliminados del área de trabajo mediante un robot colaborativo UR5e.

Basado en este equipo se ha propuesto una práctica para que los estudiantes se familiaricen con la visión artificial y manejen elementos de robótica tales como programación de robots y el manejo de sistemas de referencia.

2. DESCRIPCIÓN DEL EQUIPO DE PRÁCTICAS

El equipo de prácticas se muestra en la figura 1 y está formado por el robot y su espacio de trabajo. En dicho espacio se definirá un área formada por una cartulina tamaño A4 de color de color negro y con un marcador ArUco en el que se pondrán tornillos correctos y defectuosos. Mediante una cámara ubicada en una posición fuera del alcance del robot, se capturará una imagen de dicha área con los tornillos a procesar. Utilizando programación en Python y mediante la librería OpenCV se detectarán los tornillos defectuosos y mediante la librería UR-RTDE se programará el robot para que los elimine de la zona de trabajo.

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Figura 1. Disposición física de los elementos del sistema.

3. PRÁCTICA PROPUESTA

La práctica propuesta se basa en que los estudiantes utilizando el equipo descrito anteriormente, detecten los sistemas de referencia que se van a utilizar y mediante el movimiento manual del robot, capturen las coordenadas de dos de los vértices de la cartulina y del centro del marcador ArUco y los ingresen en el programa desarrollado en Python. Por otra parte, con el sofware de OpenCV ajustarán los valores de contraste para tomar nítidamente el contorno de la cartulina. El programa con esta información detectará los tornillos defectuosos y calculará sus coordenadas, y mediante la programación del robot se hará que éste los mueva hacia la zona de desechos que se habrá definido previamente.

El estudiante realizará las tareas descritas anteriormente y teniendo acceso a los programas de control, deberá realizar una memoria en la que muestre que ha comprendido todo el proceso.

4. RESULTADOS Y CONCLUSIONES

En este artículo se desarrolla un sistema capaz de detectar tornillos en un área de trabajo, identificar aquellos defectuosos y, mediante el robot colaborativo UR5e y una cámara web de bajo coste, retirarlos del área de trabajo. La práctica propuesta aplica técnicas de visión por computador, cálculos con matrices de transformación homogénea y el control de un robot colaborativo. Se espera que esta práctica de laboratorio sea de utilidad para introducir al alumnado de ingeniería en estos campos, considerados esenciales en muchos procesos automatizados con *cobots*. El enfoque práctico, que simula un proceso de inspección de calidad industrial, está diseñado para facilitar en gran medida la asimilación de los conceptos mencionados y, al mismo tiempo, despertar la motivación del estudiantado al evidenciar la aplicabilidad inmediata de la práctica.

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Innovación educativa basada en análisis de datos en la formación de ingenieros: un enfoque desde los trabajos fin de grado en ingeniería informática y mecánica

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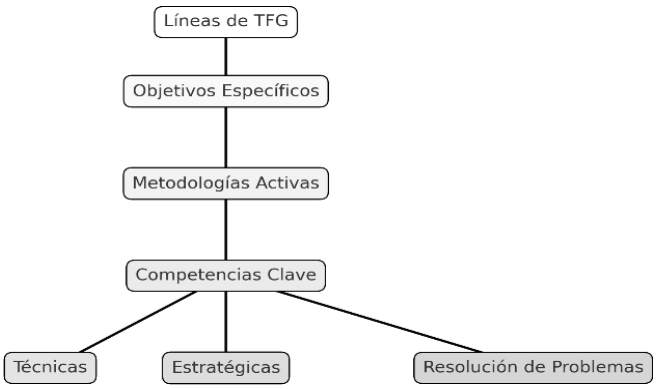
Keywords: análisis de datos, aprendizaje basado en proyectos, competencias, ingeniería

1. INTRODUCCIÓN

La transformación tecnológica está impactando significativamente los enfoques educativos en campos como la ingeniería informática y mecánica [1]. Por ello, las universidades deben proporcionar a los futuros ingenieros las competencias necesarias para abordar estos retos [2]. En este contexto, se han propuesto dos líneas de trabajo fin de grado (TFG) diseñadas para formar a los estudiantes de estas disciplinas, en el uso de análisis de datos y tecnologías emergentes con elfin de optimizar la toma de decisiones en diversas áreas empresariales, como recursos humanos, finanzas, procesos y logística. El objetivo principal de esta investigación es evaluar cómo los TFG basados en estas tecnologías pueden mejorarel aprendizaje y el desarrollo de competencias clave a través de metodologías activas [3,4,5] (ver diagrama 1). Se plantea como hipótesis que los estudiantes que utilicen análisis de datos y tecnologías avanzadas en sus proyectos adquirirán competencias técnicas y estratégicas más avanzadas que aquellos que siguen métodos tradicionales. Los objetivos específicos incluyen:

- Analizar el impacto del análisis de datos y la transformación tecnológica en los TFG.
- Evaluar cómo el uso de TIC y TAC fortalece las competencias técnicas y profesionales de los estudiantes.
- Promover el aprendizaje basado en proyectos (ABP) para mejorar el rendimiento académico y la formación práctica.

Diagrama 1. Diagrama de objetivos y competencias en los TFG



2. METODOLOGÍA

Los estudiantes trabajarán individualmente en sus TFG utilizando aprendizaje basado en proyectos (ABP) y herramientas TIC/TAC. En ingeniería informática, los proyectos estarán orientados hacia *Data-Driven Management*, optimizando decisiones empresariales en áreas como recursos humanos y finanzas a través del análisis de datos. En ingeniería mecánica, los TFG se centrarán en el uso de análisis de datos para mejorar la eficiencia de procesos empresariales, explorando cómoel uso de tecnologías emergentes permite optimizar la gestión de recursos, operaciones y logística, contribuyendo así a la sostenibilidad y mejora continua de las empresas. Adicionalmente, para optimizar el proceso formativo, los estudiantes contarán con un sistema de retroalimentación constante a través de sesiones periódicas de revisión con tutores. Este enfoque permitirá realizar ajustes en tiempo real y brindar asesoramiento técnico continuo, mejorando así la capacidad de los estudiantes para gestionar proyectos de análisis de datos y aplicar soluciones innovadoras de forma autónoma. Asimismo,se prevé la creación de un observatorio académico-empresarial, que actúe como un puente entre la academia y la industria, proporcionando un espacio de interacción en el que las empresas puedan evaluar los resultados de los TFG y ofrecer retroalimentación práctica para alinear las competencias con las necesidades del sector.

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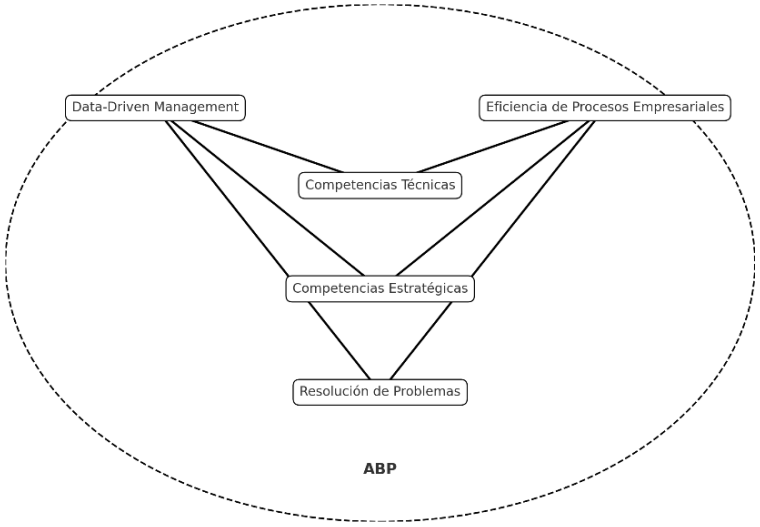
3. RESULTADOS Y CONCLUSIONES

Se espera que los estudiantes desarrollen competencias técnicas avanzadas en el uso de análisis de datos y tecnologías emergentes, aplicando estas habilidades en situaciones reales o simuladas dentro de las empresas. Este enfoque práctico permitirá resolver problemas complejos en áreas clave de las empresas, lo que mejorará su capacidad para enfrentar desafíos técnicos y estratégicos. El enfoque de innovación educativa que combina el análisis de datos y tecnologías emergentes con el aprendizaje basado en proyectos (ABP) se revela como un pilar fundamental en el desarrollo de competencias clave para los estudiantes de ingeniería informática y mecánica (ver diagrama 2). Según [6], los resultados preliminares sugieren que estos estudiantes estarán mejor preparados para aplicar sus habilidades en contextos empresariales, contribuyendo con soluciones en áreas como recursos humanos, finanzas y operaciones. Asimismo, la incorporación de TIC y TAC refuerza la formación de ingenieros capaces de enfrentar los desafíos del siglo XXI. Más alláde las competencias técnicas, el enfoque ético y la orientación hacia la sostenibilidad representan valores centrales en estosTFG, promoviendo una gestión de datos que no solo responda a la eficiencia operativa sino también a la responsabilidad social. Los estudiantes, así, no solo desarrollarán habilidades para enfrentar problemas empresariales complejos, sino quetambién se familiarizarán con prácticas éticas que refuercen la transparencia y sostenibilidad en sus decisiones. Se esperaque la integración de este observatorio académico-empresarial facilite una evaluación constante de los proyectos,proporcionando datos valiosos que refuercen la capacidad de los futuros ingenieros para enfrentar un mercado laboral en constante evolución y adaptarse a las exigencias éticas y operativas de su profesión.

Diagrama 2. Conexión entre líneas de TFG propuestas y competencias clave



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Practical session for designing a PI controller with a minimum-order observer in a linear system

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Keywords: Control engineering, Automatic control, STEM education, Linear system, Observer.

EXTENDED ABSTRACT

1. INTRODUCTION

Control engineering is a multidisciplinary field that many students find challenging due to its abstract nature. To enhance learning, a balance between theoretical knowledge and practical sessions is essential, as active learning and hands-on experience improve comprehension, particularly in abstract concepts. Educators aim to prepare students for real-world applications in industrial settings, where they need to integrate control theory across various disciplines like electrical, mechanical, and chemical engineering. Traditionally, control engineering courses focus on modeling, simulation, and control system design, making these skills crucial for students' future careers in industry [1,2].

Recent developments have explored the use of virtual and low-cost laboratories as alternatives to traditional setups, especially in light of the COVID-19 pandemic. Virtual labs offer cost savings but may limit hands-on experience, while low-cost labs using tools like Arduino and Raspberry Pi allow students to experiment with real systems. These setups have been shown to boost student engagement and provide practical experience with controller design and observer systems. Additionally, programmable logic controllers (PLCs) and data acquisition (DAQ) cards offer ways to reduce equipment costs while maintaining effective practical sessions. The study proposes a practical session where students model a second-order system and design a PI controller, enhancing their understanding of real-world industrial applications.

2. METHODOLOGY

The simulated controlled system used was made by LD Didactic®. As represented in Fig. 1, number 1 corresponds to the power supply of +15 V, 2 to the voltage input to the system, and 3 to a disturbance variable z (+2 V DC) that can be supplied by pushing the red button. Numbers 4 and 5 in the same Fig. 1 show the sensor output (0-10 V) considering second- and first-order systems, respectively. In this study, a second-order system was used (Fig. 1). Number 6 in Fig. 1 shows the compensation times measured in s. Both were set to 10 for this study. The USB-6009 DAQ from National Instruments® was used for both the input and output of the system. The experimental run was carried out with a 3 V supply. The time of the experimental run for data acquisition was around 100 s as the response was steady at that time. The sampling time was set at 0.1 s. In order to use the USB-6009 DAQ with Matlab/Simulink®, an NI-DAQmx driver was installed. The experimental run was divided into the following stages: data acquisition, modeling, PI regulator with minimum-order observer design by pole placement, and application of the PI regulator to the experimental system to evaluate the obtained results. Note that the analogical output of the DAQ is limited to 0-5 V.

3. RESULTS AND CONCLUSIONS

The parameters obtained in the identification were K 1.04, 1 (s-1) 13.53, 2 (s-1) 8.83 and d 1.9810-4 (Eq. (1)). The model fitted quite well as the system is linear. Students have to design the control system taking into consideration the model obtained and, subsequently, the results on a real system have to be assessed. Students have to evaluate the characteristics of the response by comparing the simulated system with the real one. It can be observed how the input was saturated at 5 V during the first 10 s. From this Figure, students can see the difference between the simulated and real control.

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$$\begin{bmatrix}\dot{x}_1(t)\\ \dot{x}_2(t)\end{bmatrix}=\begin{bmatrix}0 & 1\\ -8\times10^{-3} & -0.19\end{bmatrix}\begin{bmatrix}x_1(t)\\ x_2(t)\end{bmatrix}+\begin{bmatrix}0\\ 8.7\times10^{-3}\end{bmatrix}u(t)$$
$$y(t)=\begin{bmatrix}1 & 0\end{bmatrix}\begin{bmatrix}x_1(t)\\ x_2(t)\end{bmatrix} \quad (1)$$

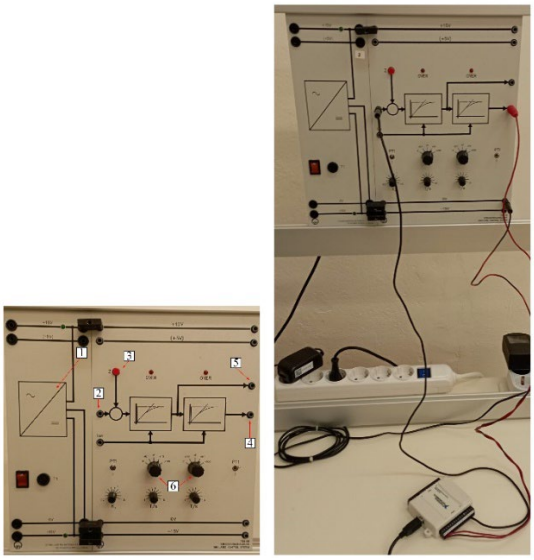

Figure 1. Practical setup with second-order system and National Instruments USB-6009 DAQ card.

4. POSSIBLE EXTENSIONS

As a DAQ system for a physical system module from L-D Didactic® has been prepared, this setup can be used with other physical systems and to develop more advanced control strategies using Matlab® and Simulink® environments. For example, the setup can be used for nonlinear systems [3] and/or multiple-input multiple-output (MIMO) systems, etc. It can also be used by degree or master's students to carry out their experimental diploma works.

5. CONCLUSIONS

The authors propose a practical session for control engineering students, focused on a second-order linear system to introduce them to real-world system modeling and control. The experimental kit is inexpensive and easy to prepare, allowing students to use Matlab®Simulink® to model the system and design a PI controller with a minimum-order observer, which requires basic programming skills.

This study aims to upgrade an existing experimental setup to enhance students' understanding of core control theory concepts. The upgraded setup allows for a variety of practical sessions related to control engineering, needing only a power supply and the LD Didactic® plant.

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Fomentando las vocaciones STEM/TIC: UNA estrategia inclusiva en Educación Permanente en Costa Rica

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Keywords: STEM, TIC, educación, educación permanente, tecnología, W-STEM.

1. INTRODUCCIÓN

El propósito de este trabajo es explorar la importancia de fomentar vocaciones científicas entre los jóvenes, especialmente en mujeres, y promover la equidad de género en las áreas STEM/TIC. Mediante un análisis de iniciativas y programas en Costa Rica y a nivel internacional, se busca destacar la necesidad de desarrollar estrategias que alienten la participación femenina en estas disciplinas. De esta forma el presente trabajo da a conocer: ii. La importancia de las STEM/TIC en Costa Rica, ii. El apoyo al cumplimiento de los objetivos de desarrollo sostenible mediante este tipo de iniciativas, iii. Vinculación del sector académico con la sociedad y las organizaciones privadas iv. La importancia de brindar cursos accesibles a toda la población y que se realicen en entornos virtuales.

Los objetivos específicos incluyen analizar las iniciativas implementadas para atraer a mujeres a las STEM, evaluar su impacto en la participación femenina y proponer recomendaciones para fortalecer la educación en este campo. Además, se busca vincular el sector académico con la sociedad y las organizaciones privadas para promover cursos accesibles y entornos virtuales que faciliten el aprendizaje. La hipótesis central sostiene que la creación de programas educativos inclusivos y entornos de apoyo aumentará el interés y la participación de mujeres en STEM, contribuyendo a cerrar la brecha de género y al avance científico en Costa Rica y a nivel global.

2. DESCRIPCIÓN DE LA CAPACITACIÓN

En 1865, las Naciones Unidas establecieron la Unión Internacional de Telecomunicaciones (UIT) para promover las tecnologías de la información y la comunicación (TIC), proclamando el cuarto jueves de abril como el Día Internacional de las Niñas en las TIC. Este día busca empoderar a niñas y jóvenes a explorar carreras en este campo. La Agenda 2030 para el Desarrollo Sostenible también enfatiza la igualdad de género y la educación inclusiva, reconociendo que las mujeres y niñas, que representan la mitad del potencial global, enfrentan desigualdades que limitan su progreso.

La Escuela de Informática ha implementado un Programa de Educación Permanente que ofrece capacitaciones en áreas como programación, ciencia de datos y ciberseguridad. Este programa participó en una iniciativa en la cual se insta a niñas y mujeres (a partir de los 15 años) a capacitarse de forma gratuita en dos grandes aristas de las tecnologías de información y comunicación como lo son la ciberseguridad y la ciencia de datos y que de esta forma consideren la opción de estudiar carreras STEM. Los cursos están diseñados para promover el autoaprendizaje mediante actividades interactivas y recursos accesibles, adaptándose a las necesidades de cada estudiante.

3. POBLACIÓN PARTICIPANTE

El estudio se centró en mujeres mayores de 15 años que se matricularon en los cursos de Introducción a la Ciencia de Datos e Introducción a la Ciberseguridad en abril de 2024. De las 283 encuestas completadas, se excluyeron 39 hombres, dejando una población de 244 mujeres, estando estas principalmente en el rango de edad de 21 a 30 años. Este esfuerzo está alineado con el Objetivo 04 de los Objetivos de Desarrollo Sostenible, ya que el 34.83% de las participantes no están actualmente matriculadas en ningún programa educativo, lo que evidencia el apoyo para facilitar el acceso a una formación profesional asequible y de calidad.

La capacitación llegó a las siete provincias de Costa Rica, destacando la Gran Área Metropolitana y con un notable 30% de participantes de provincias como Guanacaste, Limón y Puntarenas. De las matriculadas, el 75.82% proviene de áreas urbanas y el 24.18% de zonas rurales. Además, la distribución entre mujeres trabajadoras (45.90%) y no trabajadoras

(52.87%) es casi equitativa, lo que subraya la importancia de ofrecer estos cursos en modalidad virtual. Esta flexibilidad permite que mujeres con limitaciones de tiempo puedan acceder a la educación, promoviendo una inclusión efectiva que responde a la diversidad de perfiles entre las participantes.

4. METODOLOGÍA

La metodología empleada en este estudio es de tipo exploratoria, enfocándose en recopilar información e identificar antecedentes relevantes sobre el tema, así como tendencias y relaciones potenciales entre variables que serán analizadas en investigaciones futuras. Se utilizó un cuestionario de trece preguntas, compuesto por tres preguntas abiertas y diez cerradas, con la opción de profundizar en una de ellas. Este cuestionario se envió por correo electrónico a las participantes de la capacitación y estuvo disponible durante cuatro días, con un recordatorio enviado al segundo día.

Para el análisis de los datos, se seleccionaron las seis preguntas con respecto a su percepción en la temática ya que el resto de las preguntas eran datos demográficos del cuestionario que generaron información relevante. El cuestionario fue diseñado en Google Forms y administrado a través del correo institucional. Los datos se analizaron utilizando Microsoft Excel para realizar estadísticas simples y cruces de variables, además de emplear Python para análisis más avanzados, incluyendo técnicas de ciencia de datos y machine learning. Esta combinación de herramientas permitió obtener una visión inicial del tema que puede ser ampliada en estudios posteriores.

5. RESULTADOS Y CONCLUSIONES

5.1 Resultados

Los resultados del cuestionario revelaron información clave sobre el conocimiento de STEM entre mujeres menores de edad y estudiantes. De las 9 menores de edad que participaron, solo 4 estaban familiarizadas con el concepto de STEM. Entre las 159 mujeres que actualmente estudian, el 56% afirmaron conocer sobre STEM, mientras que el 44% no. Esto indica una necesidad significativa de promover el conocimiento sobre STEM, lo que resalta la importancia de implementar estrategias que amplíen la difusión de este concepto entre las estudiantes.

Asimismo, se identificaron actividades que podrían motivar a más mujeres en STEM/TIC, destacando palabras clave como "cursos", "programación", "talleres", "juegos" y "tecnología" en las respuestas abiertas. La mayoría de las participantes valoraron la iniciativa por su potencial para mejorar su currículum y aumentar sus opciones de empleo en sectores de alta demanda, como la ciberseguridad y la ciencia de datos. Además, se observó que algunas participantes ya contaban con conocimientos previos, especialmente en ciberseguridad, un campo con un crecimiento del 42% en empleos recientemente. Estos hallazgos subrayan la necesidad de continuar promoviendo la educación y capacitación en estas áreas para mejorar la representación femenina en STEM/TIC.

5.2 Conclusiones

Se destaca la importancia de hacer seguimiento a las mujeres que participaron en los cursos para ofrecer capacitaciones complementarias, así como la necesidad de crear espacios para que las menores conozcan las carreras STEM y las oportunidades de becas en la Universidad Nacional. Además, se debe identificar a las participantes que solo tomaron un curso para ofrecerles acceso gratuito al otro y mejorar su currículum. Se sugiere realizar un grupo focal con mujeres trabajadoras para entender mejor sus necesidades de actualización profesional y es crucial llevar a cabo un estudio para verificar si todas las mujeres completaron la capacitación, analizando las razones de quienes no lo hicieron. También se propone ofrecer nuevamente las capacitaciones a más mujeres para motivar su participación y planear capacitaciones avanzadas en los mismos ejes temáticos. Se logró involucrar a mujeres fuera del Gran Área Metropolitana, alcanzando regiones interesadas en las capacitaciones, y la modalidad virtual permitió una mayor accesibilidad a las mujeres trabajadoras con limitaciones de tiempo.

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Development of Curricula and Educational Resources for New Technological Approaches in Dentistry

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Keywords: dentistry, digital technology, training material, educational curricula

1. INTRODUCTION

The Integrated and Advanced Manufacturing Research Group of the University of Las Palmas de Gran Canaria (ULPGC), with the University Politehnica of Bucarest (UPB) and the University Niccolò Cusano (UNICUSANO) have started a work line for the development of training material in digital dentistry.

The origins of this work line are found in a European Erasmus+ program in the field of "Vocational Education and Training" called "New Technological Approaches in the dental technique (NTA)". Technology and materials in dental applications are progressing much faster than the regular dentistry departments can understand and adapt, dental technicians being compared daily with new challenges, for which there is no information open available.

The main objective of this work is to develop a training material to improve the knowledge of graduates of the faculties of dental technology, medical engineering and materials science as well as dental technicians without knowledge in using digitalization in their job, by creating and implementing a new curriculum, adapted to the training needs in dentistry techniques. This work has resulted in curricula and educational resources for dental training, which will be made available through the implementation of the piloting program.

2. METHODOLOGY

This project has developed training material to improve dental technology skills of main Higher Education Institutions (HEIs), Vocational Education and Training (VET) and teaching staff of the partner organizations. The methodology has been divided into 6 sections: the search of existing curricula, survey to target groups, stakeholders' point of view, development of a dental engineering curriculum, development of training material and future phases.

The existing curricula analyses current training methods, compiling the contents of each on digital technology in dentistry. The survey gathered the training needs of professionals in the sector on digital dentistry. The survey is composed of 13 questions. The survey was designed in Microsoft Forms to its dissemination and translated to Romanian, Italian, English and Spanish. Two online meetings were organised with stakeholders from dental sector, to refine the knowledge of the concrete training necessities of the target groups. The first one was just with Italian professionals. The second one was an international meeting with professional from the three countries.

The development of a dental engineering curriculum consists of elaborating courses on smart technologies and materials, such as dental technology, medical engineering, materials science and 3D printing. For each course, a teaching guide and a manual is written with all specific content to complete 80 hours of training. Moreover, a PowerPoint presentation for each subject is developed for a self-teaching. The future phases will be to implement this training material, first into a piloting of the new dental engineering training program and next, such as official master.

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3. RESULTS AND CONCLUSIONS

The results of the existing curricula in Spain were two dental technician programs, a biomedical engineering degree at seven universities, three master's degrees in digital dentistry, and a postgraduate course. Italy offers diverse degrees in dental fields across 38 universities, multiple master's programs, and several dental technician courses, while Romania features licenses in Dental Medicine and Dental Technique, alongside two specialized master's programs.

One of the principal results of the survey was the interesting modules to complement the training (Figure 1). The 29% of respondents would like to expand their training in this field in 3D modeling software (CAD), 21% in digital image data processing, and 20% in 3D manufacturing. This gives us an idea of where to focus the content of the pilot program.

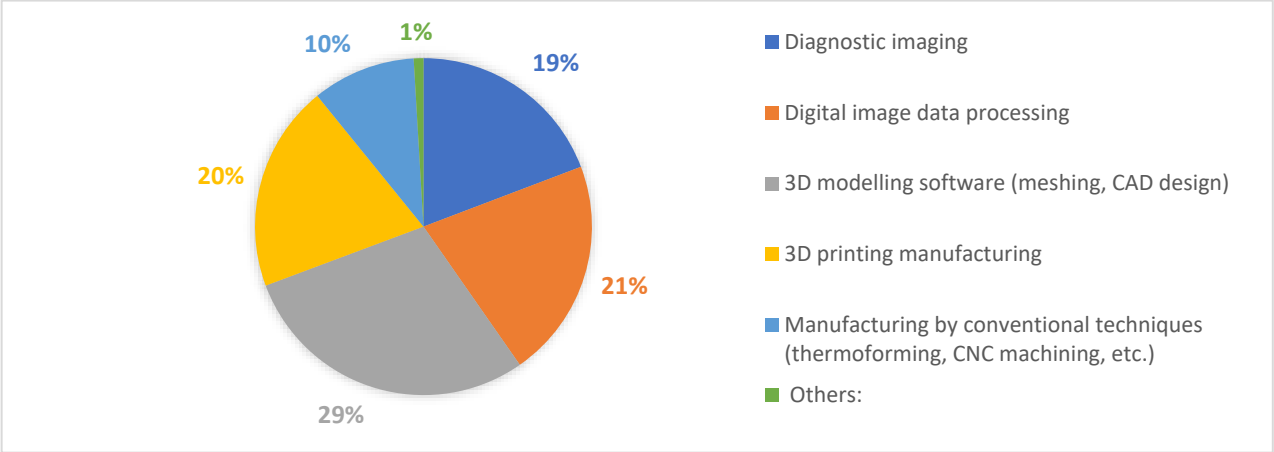

Figure 1. Result of interesting modules to complement the training.

The summarize of stakeholders meeting was that they suggested structuring curricula as modular courses with certification, emphasizing the importance of providing an overview of available technologies and future trends, along with practical examples focusing on open-source software. Finally, dental engineering curriculum is divided into 16 courses. Their training material is composed of a teaching guide, a manual and a PowerPoint presentation (Figure 2).

Figure 2. Example of an extract from the presentation of “Introduction of digital technology in dentistry".

In conclusion, an analysis of dental education in Spain, Italy, and Romania shows that while fundamental digital technology training is present at technician and degree levels, it is more comprehensive in master’s programs. A survey highlighted a significant gap in digital skills among professionals, with only 4% receiving relevant training in their degrees, leading many to seek further education through master's programs. There is strong interest in enhancing skills, especially in 3D modelling, with a preference for blended learning. The proposed curriculum aims to provide a thorough overview of technologies, practical examples using open-source software, and insights into future trends, reflecting high demand for improved digital training, as indicated by 79% interest in a pilot program.

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Developing soft skills for law students through the flipped learning method

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Keywords: soft skills, flipped classroom, legal studies

EXTENDED ABSTRACT

This paper explores strategies for cultivating soft skills in law students, ensuring they are well-prepared for multidisciplinary environments. The benefits of flipped learning are discussed at length and a sample flipped learning activity teaching soft skills for law students that has proved successful at NBU is presented. The activity can be used as a blueprint, adapted or as is in any law class for teaching, developing or practicing negotiation and conflict resolution skills, which are quite relevant for future practitioners in the legal profession.

In today's rapidly evolving professional landscape, technical expertise alone is insufficient for success. Law students must acquire not only domain-specific knowledge but also transferable soft skills — such as communication, critical thinking, teamwork, and leadership — that will enable them to thrive in a variety of contexts. These soft skills are the bridge between technical competence and real-world application, facilitating collaboration, adaptability, and problem-solving across disciplines. Teaching these transferable skills to students from diverse academic backgrounds helps them become versatile professionals, capable of addressing complex societal challenges. Soft skills are integral to the practice of law, complementing technical legal knowledge. Lawyers must possess strong interpersonal communication, empathy, the ability to work collaboratively, and problem-solving skills in high-pressure situations. However, the time specifically devoted to this aspect of the learning process at universities is negligibly small. Admitting that soft skills are central to the effective practicing of the legal profession since it largely entails working with people, Williams and Do (2022: 14) claim that “law academics tend to be resistant to teaching soft skills. The main reasons cited are that it is beyond the scope of their role as a law academic, and that it is not possible to add those skills to the already crowded curriculum”. By incorporating experiential learning, interdisciplinary projects, and ethical discussions into their education, students are equipped not only with technical expertise but also with the essential soft skills needed to collaborate, innovate, and lead in various career paths. This holistic approach to education ensures that graduates can navigate the challenges of the modern world with confidence and competence.

However, traditional legal education tends to emphasize doctrinal knowledge and theoretical analysis over these skills, which can leave students underprepared for the realities of legal practice. The flipped classroom is an innovative teaching model that has gained popularity in recent years, especially in higher education. It offers a unique solution by focusing classroom time on practical, hands-on experiences that cultivate these crucial competencies. It is an innovative teaching model that has gained popularity in recent years, especially in higher education. This pedagogical approach reverses the traditional model of teaching by delivering instructional content, often online, outside the classroom, and moving active learning, including exercises and group activities, into the classroom (cf. Bergmann & Sams 2012, Van Alten et al. 2019, Meyliana et al. 2021, Han et al. 2024). For law students, flipped learning presents a powerful method for teaching soft skills, such as communication, teamwork, critical thinking, and emotional intelligence, which are essential for success in the legal profession. By transforming passive learning into an active, student-centered process, flipped learning fosters deeper engagement with both theoretical knowledge and the development of critical soft skills.

Additionally, it fosters greater student accountability, collaboration, and flexibility, all of which are essential for successful learning. As universities continue to adopt innovative teaching methods, the flipped classroom stands out as a promising approach that can significantly improve outcomes for learners. Modern interactive learning methods emphasize active engagement, collaboration, and the use of technology to enhance the learning experience. These approaches are increasingly integrated into legal education and other fields to foster deeper understanding, critical thinking, and practical skills.

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It is argued that although there have been studies that do not support fully the effectiveness of flipped learning (cf. Fisher et al. 2024), there are many benefits to this method in the development of soft skills for law students. One such benefit is students' deeper engagement. By moving passive content delivery out of the classroom, flipped learning maximizes the time spent on active, hands-on learning. This shift leads to greater engagement, as students are directly involved in discussions, problem-solving, and collaborative exercises that mirror real-world legal challenges. Another is personalized feedback: flipped learning provides more opportunities for personalized feedback, as instructors can observe students' interactions and decision-making processes in real-time. This feedback is crucial for the development of soft skills, such as communication and emotional intelligence, which are difficult to assess in traditional lecture formats. A third and a very important one is the self-paced learning that this method provides: it allows students to absorb theoretical knowledge at their own pace, freeing up classroom time for the development of soft skills. This self-paced learning is particularly beneficial for diverse learners, as students use class time more efficiently.

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Academic Presentation Training: a Flipped-Classroom Tool to Enhance Academic Communication in an EMI Environment

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Keywords: EMI, EFL, academic presentations, presentation model

EXTENDED ABSTRACT

1. INTRODUCTION

Nowadays, academic training creates opportunities for university students to develop and apply linguistic and cultural knowledge and skills in order to communicate in an English Medium Instruction (EMI) academic environment. Academic mastery of English as a foreign language (EFL) is part of many EMI university programmes taught worldwide. Based on observations, training and research in a course on preparation and delivering academic presentations in English in the bachelor's degree programme of Applied Foreign Languages for Administration and Management (in English and a second foreign language) at New Bulgarian University, the article focuses on training students to prepare and deliver EFL academic presentations as a flipped-classroom tool to enhance academic communication in an EMI environment. Since the field is little researched, while EFL training scarcely masters presentation skills involving certain aspects causing particular difficulties for learners, it is viewed necessary to create a broader foundation on which to step in order to suggest a presentation model to follow in an EMI academic environment.

2. METHODOLOGY

The study's scope is to analyse the role of academic presentation in EMI environment, the influence of cultural differences in academic presentations, developing skills for academic communication through presentation, as well as the possibility of building an academic presentation model. Its purpose is to analyse the relevance of academic presentations in EMI environment, to examine the impact of presentations on the development of academic communication skills in English as a foreign language through surveying students enrolled in the bachelor's degree programme of Applied Foreign Languages for Administration and Management (in English and a second foreign language) from 2017 to 2022, to investigate the cultural aspects of presentations and their impact on communication, and to suggest a model for effective academic presentations.

3. RESULTS AND CONCLUSIONS

This outlined training incorporates strategies tailored to low-context cultural communication, indicating that reducing anxiety can be achieved through skill-building and familiarisation with cultural norms. All in all, structured training and cultural adaptation are effective in overcoming communication anxiety, particularly in EMI environments. This highlights the importance of preparing EFL learners not only in language proficiency but also in mastering the cultural communication styles that can influence their academic and professional success. To support students in mastering presentation skills, several pedagogical approaches can be integrated into the training process. The Natural Approach, which emphasises language acquisition in a low-stress, immersive environment, can help reduce foreign language anxiety by allowing students to practise preparing and delivering presentations in a more relaxed setting. The Task-Based Approach, focusing on real-life, practical tasks such as preparing and delivering presentations, encourages students to learn by doing. Additionally, Suggestopedia, which uses positive reinforcement and relaxation techniques, can further reduce anxiety and boost students' confidence in their presentation abilities. Personality traits, as outlined in Holland's theory, also play a critical role in how students approach presentations. By combining these approaches with the deliberate use of non-verbal communication and culturally informed presentation strategies, a comprehensive academic presentation model can be suggested that helps students of all personality types succeed. This model encourages them to overcome communication anxiety, develop presentation techniques, and build confidence, ultimately leading to more effective and impactful presentations.

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Flipped Classrooms in EdTech: Enhancing Student Engagement and Learning Outcomes

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Keywords: Flipped Classroom, Student Engagement, EdTech, Interactive Learning

1. INTRODUCTION

The traditional classroom model, characterized by lecture-based teaching, is increasingly being challenged by innovative educational methodologies that emphasize student-centered learning. One of the most prominent approaches is the flipped classroom, which involves reversing the conventional learning environment. In flipped classrooms, students are introduced to new content outside of class, typically through video lectures, and engage in interactive, practical activities during class time. This model allows students to control the pace of their learning and promotes active participation when they are with their peers and instructors.

2. METHODOLOGY

2.1 Methods and Objective

This study employs a mixed-methods approach to analyze the impact of flipped classrooms on student engagement and learning outcomes. The methodology combines qualitative and quantitative data, including literature reviews, case studies, and personal observations from the Leadership Fellowship training. The key components of the methodology are:

1. Literature Review: A comprehensive review of current research on flipped classrooms, focusing on their implementation, benefits, and challenges. Sources include academic journals, conference papers, and educational articles.
2. Case Studies: Analysis of case studies from institutions that have successfully integrated flipped classrooms, with a specific focus on how EdTech tools have been utilized to enhance learning. This includes examples from experience at the University of Florence and Nantes.
3. Data Collection: Data was collected from surveys, academic performance records, and in-class observations. During the Leadership Fellowship training, I observed the use of digital tools such as interactive voting systems, suggestion-sharing platforms, and real-time feedback applications.
4. Qualitative Feedback: Interviews with educators and students involved in flipped classrooms were conducted to gather qualitative insights into their experiences and perceptions of this learning model.
5. Statistical Analysis: Quantitative data was analyzed using statistical methods to assess the impact of flipped classrooms on student performance metrics, including grades, participation rates, and engagement levels.

2.2 Methods: Search Strategy, Eligibility Criteria and Data Synthesis

This study aims to explore the impact of flipped classrooms on enhancing student engagement and learning outcomes, drawing on the latest literature and integrating insights from personal experiences and recent leadership training. The methodology adopted for this research involved a systematic review of existing literature, structured interviews, and participatory observations. This approach aligns with established methodologies in educational research, particularly the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines, which are known for their structured approach in synthesizing qualitative data.

3. RESULTS AND CONCLUSIONS

3.1 Enhanced Student Engagement

The analysis of flipped classrooms reveals several key findings that highlight the impact of this pedagogical model on student engagement, learning outcomes, and classroom dynamics. Drawing on data from literature reviews, structured

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interviews, and participatory observations during the EUniWell Leadership Fellowship training, the results underscore both the advantages and challenges of implementing flipped classrooms in higher education.

The flipped classroom model significantly increases student engagement by shifting the focus from passive listening to active participation. In traditional lecture settings, students often play a passive role, merely absorbing information. In contrast, flipped classrooms require students to engage with lecture materials before class and participate actively in in-class activities, such as problem-solving, discussions, and collaborative projects.

4.3 Positive Perceptions of Technology Integration

Both students and educators expressed positive attitudes towards the integration of educational technology tools in flipped classrooms. The incorporation of EdTech tools such as interactive voting systems, real-time feedback platforms, and collaborative online spaces was found to be particularly effective in maintaining student interest and enhancing the overall learning experience [3].

4.8 Benefits

Enhanced student engagement in flipped classrooms create a dynamic and interactive learning environment. By prioritizing active participation, students are more engaged and involved in their learning. The model encourages real-time feedback and promotes a more personalized and responsive classroom experience [5]. For example, during my Leadership Fellowship training, we used digital platforms for voting and sharing suggestions, which allowed students to actively participate in class discussions and collaborate more effectively.

Individualized learning pace become one of the significant advantages of the flipped classroom is that it allows students to learn at their own pace. This flexibility benefits a wide range of learners, enabling them to review materials as needed and come to class prepared to apply their knowledge in practical settings.

Improved understanding and retention utilize active learning techniques that help reinforce students' understanding of the material, leading to better retention and mastery. Empirical studies suggest that students who participate in flipped classrooms often achieve higher academic outcomes compared to those in traditional lecture-based settings [4].

4.10 Effectiveness and Research

Studies on the effectiveness of flipped classrooms present mixed results. While many highlight increased student performance, engagement, and satisfaction, the success of the approach largely depends on how well it is implemented and the degree to which students are able to adapt to the flipped learning model. Research indicates that the flipped classroom is particularly effective in STEM fields, where practical application and problem-solving are integral to the learning process [1]. However, with careful planning, the model can be adapted successfully across various disciplines, including humanities and social sciences.

The flipped classroom model has been successfully applied across a range of educational settings, including K-12 education, higher education, and professional training. It is versatile enough to be used in large lecture halls, small seminar rooms, and even fully online courses [2]. The adaptability of this model makes it a valuable approach for enhancing learning outcomes across diverse educational contexts.

The flipped classroom represents a transformative shift in pedagogical strategies, emphasizing active, student-centered learning over traditional lecture-based instruction. While the approach offers significant benefits, including enhanced engagement, personalized support, and improved learning outcomes, it also presents challenges related to preparation, accessibility, and student adaptation. With thoughtful implementation and careful consideration of students' needs and available resources, the flipped classroom can significantly enhance the educational experience, fostering deeper learning and critical thinking skills among students.

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Evaluation of the Applicability of the Flipped Classroom in Higher Education from a Multidisciplinary Approach

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Keywords: learning methodology, active learning, multidisciplinary approach, student autonomy, teacher as coach.

EXTENDED ABSTRACT

1. INTRODUCTION

The Flipped Classroom methodology is a pedagogical approach that reverses the traditional teaching model. Instead of receiving the lecture in class, students review theoretical content at home through short videos, readings, or other materials. Classroom time is then dedicated to practical, collaborative activities or problem-solving, with direct teacher support. This approach encourages more active and autonomous student participation, fostering deeper engagement with the material and improving learning outcomes, in which the teacher becomes a facilitator of the teaching-learning process rather than merely a transmitter of knowledge.

Flipped Classroom is a methodology that is primarily used at the university level, although it originated in secondary education. It was reported for the first time in 2007, when two high school teachers, Jonathan Bergmann and Aaron Sams, began recording video lectures for absent students [1]. The main idea of flipped classroom methodology is to reverse the location where the main tasks of the learning process take place: "The lesson at home and homework in class" [2].

Although the COVID-19 emergency has, in many cases, pushed teachers toward a hybrid teaching and learning model, often applying the Flipped Classroom methodology [3,4], the truth is that it had already gained relevance in the years prior to the pandemic. This was due to the need for educators to adapt the traditional teaching and learning system to the new generations [5].

Additionally, this flipped classroom methodology can be combined with others, such as gamification [6], allowing the combination of academic motivation with critical thinking, leading to very positive effects [7]. Gamifying involves using games in the teaching-learning process to develop skills and competencies (collaborative work, communication, problem-solving, critical thinking, etc.), as well as motivation. The gamified flipped classroom emerges from the fusion of these two active methodologies: on the one hand, the flipped classroom, and on the other, the use of games in the teaching and/or learning process [8].

The purpose of this paper is to discuss various flipped classroom experiences developed in Higher Education, which aim to promote active learning and encourage student motivation.

2. METHODOLOGY

The flipped classroom methodology has been applied at the same university to students from different degree programs and across various academic years (from the first to the final year). The traditional flipped classroom approach was implemented using videos, self-study materials, questionnaires, activities, and quizzes, among other tools. Additionally, in some cases, a double-flipped learning or gamified flipped classroom approach was used.

Several flipped classroom experiences have been designed and developed in various degree programs at the University XX*(Information that could reveal authorship)*XX, with the participation of a total of 840 students.

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3. RESULTS

This methodology has been applied to students in scientific and technology science faculties, such as Marine Science, and in social science faculties as degree in Business Administration and Management and Law degree and Humanities, as Philology and Modern Languages degree.

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Flipping the academic classroom: insights from an action-research in humanities

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Keywords: Flipped classroom, active learning, humanities, students' perceptions

EXTENDED ABSTRACT

1. INTRODUCTION

Flipped classroom is a trending teaching methodology in the academic world and can potentially bring significant changes in students' learning outcomes. Reversing the traditional model of in-class lecture by anticipating reading and homework has proved a valuable practice to enhance students' engagement and active learning. In science classes flipped learning has been adopted for decades (chemistry, medicine, engineering, business communication, biology, etc.) and there is extensive evidence on the effectiveness of such a method in these educational settings [1, 5]. Whereas humanities courses still lack a consistent examination of the advantages and challenges of flipped learning, especially with reference to content-oriented teaching.

In the proposed paper we will examine and discuss two applications of the *flipped instructional model*: one in relation to skills-oriented classes on language teaching methodology, the other in relation to content-oriented theoretical literary studies. Both case studies have been conducted with medium or small-sized classes of undergraduate students in an Italian academic environment. Some classes were mixed groups of local and international Erasmus students, offering the opportunity to explore different learning reactions to the teaching strategy and evaluate its efficacy.

2. METHODOLOGY

Our case studies are based on a *participatory action-research* [6] conducted over the last 2 academic years at the Department of Humanities, University of xxxx. Participatory Action-Research (PAR) "legitimizes and prioritizes the expertise and perspectives that come from lived experience and situated knowledge, particularly among those that have been historically marginalized. In education research, a PAR approach typically centers the wisdom and experience of students (or school-age youth) and educators, positioning them as architects of research rather than objects of study." [4: 1].

In line with what the wide literature on this topic suggests [2, 3, 7], our PAR made use of qualitative data collection tools such as teachers' field notes and diaries, as well as students' surveys and artifacts.

Observation and data collection were carried out in two different courses over a period of 23 years:

1) the workshop on "Language and culture teaching methodology", taught in Italian within the BA programme of Foreign Languages and Cultures (mainly 3rd year students).

2) the workshop on "Theory and methods of comparative literature", taught in English within the BA programme of Modern Literatures (mostly 2nd and 3rd year students);

The data collected were compared and discussed in order to point out weaknesses and strengths of applying flipped classroom instruction in higher education humanities courses.

3. RESULTS AND CONCLUSIONS

Findings indicate that students' perceptions of flipped learning are highly positive. Students have expressed an overall appreciation of both pre-class activities and classroom interactions as defining tools in enhancing their learning outcomes and cognitive awareness. However, there remain issues that require teachers' attention, such as work timing and the planning of more consistent case studies for in-class activities. A further issue may be added to the latter: the use of advanced and interactive learning platforms. The flipped classroom practices we will discuss in the proposed paper relied on a simple learning platform for document sharing, with little or no interaction between students and teacher and among peers. Sophisticated platforms catering for different learning models are indispensable tools to implement and encourage the academic shift from traditional teacher-centered methodologies to innovative student-centered approaches.

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Engaging in course redesign is a vital goal for university education and faculty are met with the challenges of shifting the educational paradigm by turning a passive learning experience into a dynamic and interactive one. This shift can prove a complex and daunting task for teachers and students alike, especially when applied within an educational setting - such as the Italian one - obdurately centered on the traditional lecture method. Hence, pre-practice training, the availability to faculty of advanced technological tools, and an enhanced cultural awareness of the educational landscape into which the flipped method is integrated are essential to its effective implementation.

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Q&A session during an academic lecture: a new approach

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Keywords: academic teaching, Q&A session, Revised Bloom's Taxonomy, active learning, self-reflective learning

EXTENDED ABSTRACT

1. INTRODUCTION

It is quite common among lecturers to permit students' questions during lectures. I do it myself, but is it really beneficial for the process of teaching? Allowing *ad hoc* questions is perceived by listeners as an invitation to active learning. But do we, teachers, really want to be interrupted? Two obvious disadvantages are: (1) danger of losing the rhythm of the lecture, (2) difficulties in time-management. Both problems with allowing questions during lectures can be solved when we plan a Q&A session at the end of a lecture. It does not interrupt the flow of thoughts, and allow to plan in advance the amount of consumed time. But here arises another problem: how much time should we plan for such a session? If time is too short, the very idea becomes pointless. On the other hand, with substantial time left for a Q&A session we risk inefficiency in time-management. Without any good question being asked, a lecturer may be forced to ask for questions. During my tuition as a lecturer I prepared and implemented a unique method of conducting Q&A sessions. I will refer to this type of Q&A session as "the Q&A Method".

2. METHODOLOGY

The whole session consumes about 45 minutes. It is quite a lot of time and therefore the session must be planned well in advance. During a course I recommend to use "the Q&A Method" only once. The exact amount of time depends on the number of students in the group and on the accessibility of on-line tools. "The Q&A Method" has distinct features that make it different in quite unexpected way from typical Q&A. In a typical Q&A session: (1) the more active participants (i.e. number of asked questions), the longer the session lasts, (2) using on-line tools makes the session more dynamic and quicker. For some teachers an on-line tool is a must-have in handling large groups of listeners. In "the Q&A Method" time consumed for a session does indeed depend on the number of participants, but this is not a linear relation. With increase of the group, the time used for a Q&A increases slower – and therefore "the Q&A Method" works effectively in larger groups. In "the Q&A Method" the whole procedure can be performed both on-line and on-site, and, paradoxically, an on-site version is more effective in handling larger groups.

3. RESULTS AND CONCLUSIONS

The session can be either an introductory (after the first lecture), or summarizing (during the last lecture). The session can be organized on-line or on-site. Conducting a Q&A session in this manner grants several benefits: (i) checks students' understanding of material, (ii) identifies common misconceptions, (iii) forces students to self-reflection on their learning progress, (iv) encourages simultaneously both excelling and struggling students, (v) equalizes participation chances of both dominant and shy students, (vi) revises material (vii) encourages work in groups (on-site version), (viii) encourages using on-line tools (on-line version), and last but not least (ix) explains to students the rationale behind the proverb: "There are no bad questions, only bad answers".

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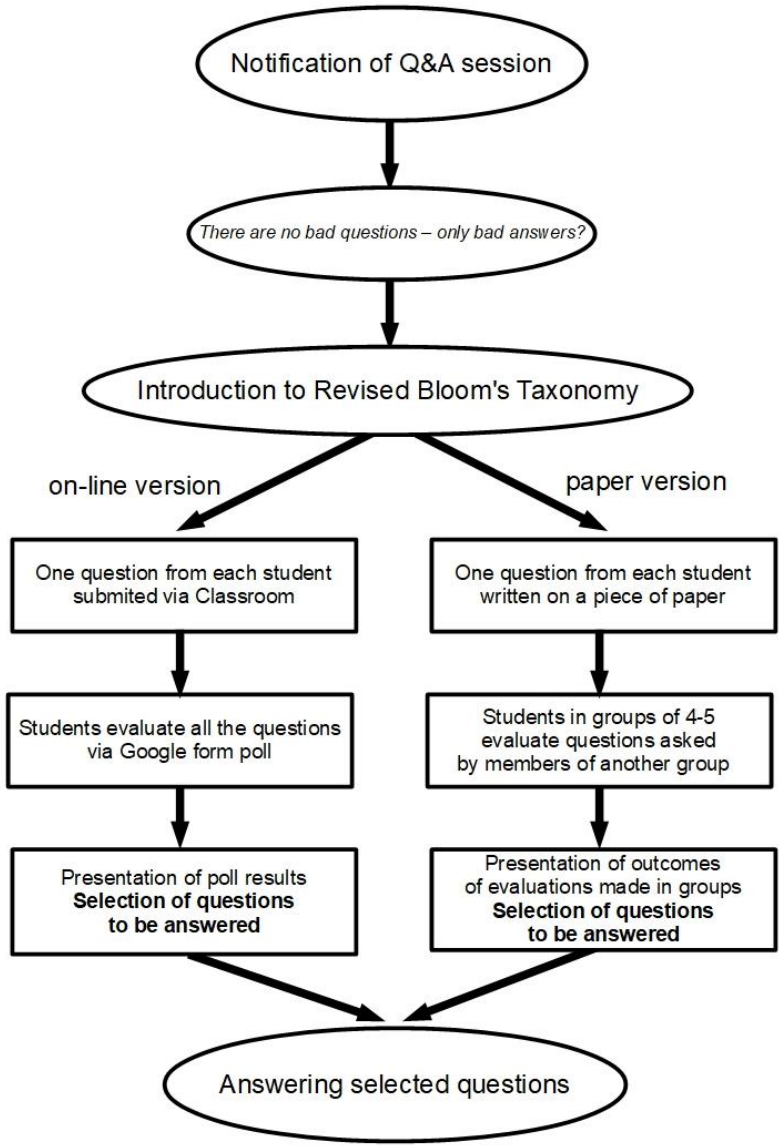

Figure 1. “The Q&A Method” as a process.

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Experiential Learning Task Examples in Teaching Advertising

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Keywords: advertising, psychology of advertising, experiential learning tasks

EXTENDED ABSTRACT

1. INTRODUCTION

Education in the field of advertising, design, and communications should be unconventional, diverse, and interesting for the students. A dynamic business implies dynamic learning: non-typical, innovative, engaging.

The elaboration depicts some of the courses in the bachelor's and master's programs in advertising at a Bulgarian university in Sofia. The disciplines cover various experiential learning tasks with the purpose to bring change and innovation into the university classroom by breaking the usual limits of conventional lectures. Some of the more prominent interactions are well-described in the article. An online survey among students is conducted to determine their explicit opinions and attitudes towards the specific experiential learning tasks as an instrument to better learning. Results show that memorization of study material, motivation, attendance and interest in the subjects increase when such tasks are included as a regular part of the teaching process. All described situations are customized for the specific lecture. The task examples are described in detail, including the steps of the activities.

2. METHODOLOGY

In order to gather feedback on the experiential learning methods used in the courses on advertising, an explicit online questionnaire was put into action. Its aim is to gauge the opinions of students and highlight the role of experiential learning tasks in their overall experience. The questionnaire includes 12 closed-ended questions, and one open question directed at students who have taken some of the advertising courses between 2022 and 2024. The survey period of gathering responses was August 2024, and it was completed by 110 respondents contacted through email.

The topic of the short questionnaire is 'experiential learning tasks as an innovative teaching method'. The research objective is to analyse the role of these interactions in successfully delivering knowledge to students in an innovative way by improving their educational experience. The research task is to create a questionnaire to capture students' opinions on the experiential learning and to present the data from it. The subjects of the study are students in advertising at New Bulgarian University (study period: 2022 – 2024). The study object are the attitudes of the target group towards the experiential learning methods. The research hypothesis assumes that experiential tasks will be explicitly recognized as a successful method for more innovative learning by a significant portion of the students; and the general perception of students about the interactions will be positive. The questionnaire begins with a key question: whether experiential tasks in the discussed courses are perceived as an innovative form of learning. This is followed by questions about the preference for courses with or without such tasks; retention of material; interesting way of conduct; usefulness of tasks; emotions evoked during tasks; tasks' impact on learning motivation; capability of attention engagement; sharing with others; willingness to attend classes; readiness to recommend the course to other students based on the experiential learning tasks. The questions are closed-ended with Likert scales.

3. RESULTS AND CONCLUSIONS

The data from the questionnaire indicates that the experiential learning methods implemented in the described courses are very-well perceived by the tested subjects. This confirms the hypothesis that experiential tasks are explicitly recognized as a successful method for more innovative learning by a significant portion of the students (87.3%) and the general

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perception of students about the tasks is very positive. 87.3% of the students claim that the experiential tasks make the courses more innovative. Almost 92% of the respondents state that they prefer courses with such tasks included in the programme. Most of the students (86.3%) are convinced that the experiential tasks have led to better retention of the study material. Over 90% find them interesting, and useful (91.8%). Most of the students reported positive emotions during the experiential sessions (93.6%). Almost 80% stated an increase in motivation for learning. Another 93.7% believe the experiential tasks enhance attention engagement. Close to 85% say they have shared with others about experiences and knowledge they obtained during a learning session that included such tasks. 74.5% claim that the experiential tasks in the courses prompted them to attend lectures more frequently. 86.4% would recommend enrolling the courses to other students.

The power of a well-designed experiential learning task should not be underestimated when professors create the situations and lessons for their curriculum, as it seems a very desired method welcomed by students.

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Gamification in higher education, the experience at ULPGC

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Keywords: Gamification, educational innovation, higher education.

EXTENDED ABSTRACT

One of the 17 Sustainable Development Goals established by the United Nations in its 2030 Agenda is to ensure inclusive, equitable, and quality education, as well as to promote lifelong learning opportunities for all [1]. In this context, active methodologies, which focus on the student and their learning process, are gaining popularity and have been shown to offer more effective and higher-quality education [2,3]. University professors, aware of this shift, are seeking strategies to strengthen students' emotional and behavioral engagement in the classroom, with the goal of improving learning and enhancing academic performance. Providing university students with an educational experience that is not only effective but also engaging and meaningful presents a significant challenge for educators. One strategy that has been increasingly successful in achieving this goal is gamification, a term coined in 2002 by video game developer Nick Pelling. This technique involves incorporating game elements and dynamics into non-game contexts [4]. In recent years, gamification has experienced remarkable growth in education due to its ability to motivate and engage students more effectively [5]. A literature review conducted by [6] highlights the growing interest within the scientific community in researching and proposing gamification projects in higher education. This review also underscores a positive predisposition among students toward the implementation of innovative learning experiences that include gamification. At the University of Las Palmas de Gran Canaria (ULPGC), various gamification initiatives have been implemented as part of educational innovation projects, aiming to provide more motivating and enriching learning experiences in several Faculties, such as Education, Marine Sciences, Engineering, and Nursing. These initiatives have involved more than 1,000 students and have utilized tools such as Kahoot, Quizziz, and Wix to design and assess gamification activities, complemented by additional resources such as Educaplay and Powtoon for creating game dynamics. The results show a clear increase in students' motivation, participation, and engagement with the subjects, highlighting the importance of gamification and educational games in teaching. These methods not only improve student motivation but also help reduce monotony by presenting learning content in a more entertaining and effective way. The impact of gamification in the educational field is broad, affecting students in different ways: behaviorally, emotionally, and cognitively. Additionally, when students' perceptions of previous gamification experiences in the classroom have been studied, it has been found that, overall, they enjoy participating in these activities and consider them valuable for their learning [7,8]. Other studies have demonstrated that students prefer the application of gamification to learning content over traditional classroom approaches [9,7]. However, gamification represents a significant challenge for education, particularly within higher education institutions, where a careful approach to its successful implementation is required [10].

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Learning by playing

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1. INTRODUCTION

Play plays a key role in the development of all human beings; it is a fundamental tool for stimulating the development of thinking, language and the ability to interact with others and with the environment [1, 2, 3, 4] . Many authors in the field of psychology have emphasized the positive values of play [5], particularly linking it to learning processes and the experience of well-being [6]. Indeed, play occurs in a context that is "outside of reality", where the risk of failure is not perceived as an error, but rather as one of the possibilities that play offers. This quality of play leads to a reformulation, a loss of interest, or a shift of attention to another activity [1].

Based on these considerations, play is a core theme within the Educational Psychology curriculum in primary education and it is a topic that needs to be experienced to be fully understood. A hands-on approach along with small group interactions are essential, aiming to break down the anonymity of the “large class group” [6, 7]. Being able to experiment play activities may foreshadow the vision of the so-called “reflective practitioner,” proposed by Schön [8] in later years. Initially implemented in face-to-face classrooms, this model was later transposed into online experiences [9, 10, 11, 12]. It also introduced opportunities for reality-based tasks and guided reflection on lived experience [13] . This hands-on approach marked the beginning of a culture of active and interactive teaching in psychological subjects taught at the University of Macerata (and beyond) since the 1970s.

Keeping the interactive model in mind, the educational and psychological value of play activities was planned to be taught using an interactive teaching-learning approach. To address these aims, a research project composed of three studies was conducted. The first study aimed to explore the positive effects of play on personal well-being in the academic classroom (emotional and social goals). In the second study [14], the experience shifted online, offering a screen-to-screen play practice addressed to verify the impact of online interactive gaming on well-being. The third study sought to promote understanding of the positive value of game formats in the teaching-learning process (cognitive goal) and to encourage reflection on the game experience in order to design play activities for children (metacognitive and learning transfer goals).

2. METHODOLOGY

Study 1: Forty-four university students participated in the study. They were invited to play board games in small groups. Before and after the experience, they completed a questionnaire assessing their usual state of well-being (T0) and their well-being during the gaming experience (T1) in the classroom.

Study 2: Forty-nine students in a post-specialization course participated in an online class where they first completed a questionnaire about their well-being (T0). They were then divided into online breakout rooms to interact and play in small groups. After the game activity, they completed a questionnaire assessing their well-being during the game (T1) as well as a satisfaction questionnaire. The questionnaires used in Study 1 were the same as those in Study 2.

Study 3: Eighty-six Primary Education Training students participated in the second study. First, they engaged in board games. Then, they attended a theoretical lesson on the main theories related to play activities [15] in teaching-learning processes at primary school [16] and on strategies for teaching through play (cognitive goal). At the end, students organized into small groups to design a game for children to aid in learning road safety. The designed games and their descriptions [were assessed as insufficient (0), good (1), or excellent (2). Games evaluated as good or excellent indicated an adequate level of students' knowledge and awareness about play and games.

.3. RESULTS AND CONCLUSIONS

The experience of play had a positive effect on the students’ perceived well-being in all cases. Students involved in the board game design activity showed an elevated understanding of the contribution of games to learning processes and psychological development. Results from Study 1 showed that the students’ level of well-being was significantly lower than their perceived well-being during the game session, $F(1, 43) = 22.945$, $p = .000$, $\eta^2 = .348$. This finding suggests that the presentation of learning content in a playful form may promote the well-being of university students. The result

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is consistent with research on the positive effects of game activities in fostering psychological well-being (Csikszentmihalyi, 2000). Similarly, Study 2 revealed that the general level of well-being was lower than the well-being experienced during the game-based activity, F (1, 48) = 130.31; p = .000, even when the game experience was conducted online, with students playing together through screen mediation (Guardabasis et al., 2024).

Results from Study 3 showed that students demonstrated an adequate mastery of knowledge about games through the board game projects: thirteen games on road safety were developed, and they were evaluated with good scores (10 = good; 3 = excellent). In addition to the psychology teachers, a toy designer was involved in the evaluation process.

In conclusion, consistently with previous studies about the role of games in adult education (Boghian et al., 2019), this research suggests that incorporating play into academic lessons can serve as an effective tool in the educational process, promoting students' well-being, fostering deep learning, and supporting learning transfer. Future investigations and potential projects centred on learning through play shall be explored.

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Approaches and key indicators for evaluating the outcomes of project-based learning in VET

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Keywords: vocational education and training (VET), project-based learning (PBL), key performance indicators (KPI), digital technologies, learning innovation

INTRODUCTION

Modern vocational education and training (VET) techniques combine many elements that interact dynamically and are constantly changing. Innovative professional training in the age of technological progress has not only technical but also social and emotional-cognitive elements. Different approaches to measuring innovative learning in VET tend to focus on diverse indicators: professional characteristics of the trainer, learning dynamics, behavioral changes in the learner, decision-making approaches, quality of communication, technical resources, and others. At the same time, the increasing pressure from the impact of rapidly developing technological innovation is compounded by the effects of globalization. It demonstrates how remarkably the idea of "efficiency" can change over time. As a result, the importance of innovative VET approaches, which are challenged to optimize interactions between learners and technology and to enhance sustainable and human-centered social and economic activities within technological innovation, is increasingly paramount. Project-based learning (PBL) is a type of innovative, progressive learning method that has the potential to support and empower learners within the framework of digital transformation and the use of increasingly intelligent machines and technologies in the learning process. In the Republic of Bulgaria, innovative VET practices have been developed and implemented significantly recently. The policy objectives for the development and improvement of VET at the national level are:

- to ensure access to VET for citizens according to their personal interests and abilities;
- to meet the needs of a qualified labor force in a competitive labor market;
- to provide conditions for the functioning and development of a VET system based on the cooperation between institutions providing VET, state institutions, and social partners [1].

The study's object is 216 professionals who underwent innovative VET practice from May 2023 to May 2024. Respondents work in the IT and Consultancy Sectors and have at least three years of experience in their respective functional areas.

The study's subject is innovative VET practices, mainly PBL, and the assessment of its results to improve the overall quality and value of VET practices provided in the studied economic sectors.

The main objective of the present study is to map and analyze the dominant approaches and indicators for evaluating the results of the innovative techniques applied in VET and how they have developed over the last year in two economic sectors (IT sector and Consultancy Sector) in the Republic of Bulgaria.

The main tasks facing the construction of sustainable approaches and key indicators for evaluating the results of innovative VET practices in the Republic of Bulgaria are:

1. Inclusion of participants in innovative VET practices in approaches to its evaluation.
2. Maintaining up-to-date information on the key indicators used to evaluate the results of innovative VET practices.
3. Determining the changes in innovative VET practices to determine their impact on future opportunities and challenges.
4. Linking the changes of innovative VET practices to their effects to understand and manage them better.
5. Analyzing indicators for evaluating innovative VET practices in different economic sectors.

METHODOLOGY

A multifaceted research design was developed that drew on information from several sources and incorporated findings from earlier research studies:

a) a review of the literature to analyze the development in the evaluation of the results of innovative VET practices and to identify the evaluation approaches in the studied economic sectors;
b) comprehensive data provided by the study participants based on an online questionnaire specially prepared for the study;

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c) a study of the national VET system and providers which aims to complement the analysis of specific VET practice changes in the Republic of Bulgaria.

The primary source of information, along with the literature review, is an online questionnaire distributed through online survey software and interviews with relevant key stakeholders to explore further specific aspects related to approaches and evaluation of outcomes of innovative VET practices in the Republic of Bulgaria. The study period is one year (May 2023 – May 2024). Each questionnaire consists of several parts focused on a specific topic. The first part focused on the first research question ("Which PBL evaluation indicators from the list are most important?"). Each subsequent part of the questionnaire consists of an in-depth analysis of the specific topic, analyzing individual approaches and evaluation indicators, their use, development, and comparison of their use in the studied economic sectors. Thus, separate parts of the questionnaire were used to illustrate and further explore change processes about specific evaluation approaches and indicators and their combination. The main changes in innovative learning in VET during the research period and the effects of the changes were studied. Also, the impact of digitization on assessment approaches and possible long-term changes (some changes may only be temporary, while others could be permanent) on innovative VET practice in the sectors considered were highlighted.

RESULTS AND CONCLUSIONS

The research results helped to gain a deeper understanding of the trends in innovative VET practices in the Republic of Bulgaria on a one-year basis and within the two economic sectors studied - the IT sector and the Consultancy Sector. Based on the obtained results, the following main trends were established:

1) Differences are observed between the key indicators used to evaluate innovative VET practices in the two economic sectors studied: while the consulting services sector supports the use of more standardized indicators to assess the results of innovative VET practices, the IT sector focuses on implementation of indicators related to digital transformation and technological development;
2) The pressure for change and the effects it causes within innovative VET practice increases its impact on the participants in the learning process and their needs;
3) External transformations of the environment (digital evolution) have the potential to lead to changes in VET policies and programs;
4) The push for immediate change, for example, when learners have to work independently in virtual space, reinforces the need to develop new approaches to effectively delivering VET through digital learning.

The results of the study also show that some of the future challenges to building sustainable approaches and indicators for evaluating the results of innovative learning in VET are each likely to be related to the increasingly assertive use of digital technologies, AI, sensory technology, and big data. These processes can become transformative tools and require the construction of VET practices based not only on assumptions that individual participants possess a high set of skills universally developed in response to technological advances but also on documented data about their competencies and opportunities. The optimization of a wide range of learning techniques and technological innovation will continue to accelerate, requiring VET providers to sustainably manage both the development and use of digital tools for their educational purposes. The systematic development of innovative educational approaches and the sustainable evaluation of their effectiveness can strengthen the societal role of Industry 5.0 as an engine of prosperity and promote the digital transition for the benefit of both the economy and society.

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Application of the project method in teaching legal disciplines

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Keywords: project, project method, interdisciplinary projects, educational process

1. INTRODUCTION

In training future lawyers, in addition to good theoretical training, an important role is played by the formation of such practical skills as legal argumentation and analysis, critical thinking, oral and written advocacy skills, emotional intelligence, the ability to search, communicate effectively, and have basic knowledge of management. All these skills can be developed when carrying out practical cases, which a lawyer may encounter in valuable activities. The project method is one of the pedagogical technologies that combines theoretical material and practice.

The project method has been used in education for a long time but was first described in the book "Project Method" 1918 by the American psychologist and educator William Kilpatrick. After that, the project method quickly spread among Northern and Central European countries.

The project method is actively and quite successfully used in foreign universities of various fields of sawmilling: in the USA, Great Britain, Belgium, Israel, Finland, Germany, Italy, Brazil, the Netherlands, and many other countries. Today, scientists refer to the project method as a technology of the 21st century that involves adaptation to the changing conditions of human life in a post-industrial society [1-4].

At the beginning of the XXI century. Teachers recognize project learning technology as one of the personally oriented pedagogical technologies based on identifying the unique essence of each student (the student) and his individuality. At the same time, the role of the teacher changes. Its main task is to create a suitable educational environment where the student can rely on his potential. Students gain experience in solving real problems and contemplating the future independent life they project in their studies. In Ukrainian pedagogical practice, projects appeared in the last decade due to the activities of international organizations that developed and disseminated educational projects. Currently, this method is widely used in training specialists of various specialties, as it has rich didactic opportunities for training.

2. METHODOLOGY

Implementation of the research goal includes the following research methods: summarization of the latest scientific publications on the analysis of student training; historical method, which is used to analyze the features of the development of the project method and its implementation in modern legal education. The system method was applied to investigate the stages of project preparation and the content of its main parts. The formal-logical or dogmatic method was used to formulate concepts and definitions that reveal the essence of the project method.

3. RESULTS AND CONCLUSIONS

Design helps students to understand the role of knowledge in life and learning. Knowledge ceases to be a goal; it becomes a means in fundamental education, helping to master cultural thinking patterns to form one's mental strategies, allowing everyone to independently master the assets of science, technology, technology, and culture.

This method was used to teach the optional discipline "Local democracy: best European practices for Ukraine." This discipline aims for students to achieve modern, constructive, fundamental thinking and a system of special knowledge in European practices of local democracy. Having studied the available domestic and European tools of local democracy (for example, petitions, participatory budgeting, elections, etc.), students, divided into groups, choose a specific problem that is in their city, village, street, or entrance (for example, environmental issues, garbage removal, lack of convenient infrastructure) and with the help of tools of local democracy develop a project to solve this problem. Students work on a project over an extended period – from a month to a semester – that engages them in solving a real-world problem while applying their theoretical knowledge and developing critical thinking, collaboration, creativity, and communication skills.

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The project method will make it possible to develop skills in applying the tools of local democracy to solve real, local problems. This method contributes to the formation of decision-making skills based on the goals of sustainable development, particularly the sustainable development of cities and communities. The innovative use of the proposed method consists of the visualization of the research subject, mainly due to the possibility of participants initiating petitions, participating in city council meetings, conducting surveys of community residents regarding the tools of local democracy, etc.

One of the essential methods for the successful implementation of the project is the competence approach, which will not only contribute to the expansion of the knowledge of students and other participants of the online course but will also form fundamental skills in applying the tools of local democracy to solve specific regional problems. A special place in the project is the formation of civic competence of participants of all categories: students, local activists of public organizations, officials of local self-government bodies, and civil servants.

Trust, cooperation, and providing students with greater independence are at the heart of the project method. After all, it is not the teacher who defines a specific problem, but the students define it based on their vision. The value of this method lies in the fact that it is wholly focused on the student while it is based on the principle of "learning by doing." Unlike traditional education, this method allows students to solve a specific community problem with minimal guidance from a teacher perceived as a facilitator rather than a provider of knowledge.

The project method is a good stimulator of the student's interest in the educational material and the discipline. Its use is possible in any course when studying legal disciplines because developing practical skills and creating conditions as close as possible to practice are essential factors in forming a future specialist. It is also advisable to use an interdisciplinary approach when using this method. In particular, when combining knowledge from several subjects, it is possible to approach the problem's solution from different angles, making it possible to solve it more effectively.

As a result of the application of the project method, it was possible to obtain the following results:

1. Activation of training. The development of specific projects accelerates the process of students acquiring practical skills for solving real problems and helps students learn in practice, contributing to active learning.
2. Increasing students' motivation to study legal disciplines. Students understand the importance of studying legal disciplines when solving practical situations and relying on theoretical knowledge. It is possible only through thorough theoretical training to solve the problem and correctly apply law norms effectively.
3. Development of independence and responsibility. The project method focuses on students' independent activity, starting with choosing a topic and ending with selecting a tool for solving it. This method contributes to students' understanding of the importance of learning to acquire knowledge independently, correctly assigning roles in a team, planning time, etc. Each student can perform tasks corresponding to their capabilities and interests when working on a project. Using this approach, students can improve their self-reliance and take responsibility for their learning. They can gain valuable independent learning experience and develop an individual learning style that works best for them.
4. Development of critical soft skills that can be acquired through own experience: mastery of constructive communication.

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Interdisciplinary project-based learning: the impact of co-teaching on students' achievement

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Keywords: Interdisciplinarity, project-based learning, co-teaching, higher education.

1. INTRODUCTION

Since 2021 the University of Macerata (Italy) has applied a formal recognition of co-teaching practices as a means of innovation which promotes a focus on interdisciplinarity in both didactics and research. The department of Education, Cultural Heritage and Tourism has widely embraced such practice, mostly in its degrees addressed to the training of teachers/educators; the present study reports, specifically, a multiple-case design [1, 2] based on the socio-pedagogical curriculum of the three-year degree course in "Education Science" (first-cycle degree).

The above mentioned curriculum aims at training professionals able to act in different educational contexts (formal, informal, non-formal) which cover a variety of work areas (school, day care, rehabilitation centers, youth centers, migrant and refugee services, etc.) that often require educators to tackle complex challenges. Reaching an interdisciplinary competence is, then, of paramount relevance in terms of employability, since the variability and the multifaceted characteristic of social work calls for a systemic approach and educators needs to adopt a holistic perspective in building their professional identity. An interdisciplinary co-teaching practice may emphasize the interconnectedness of the curriculum core concepts, providing both an effective framework, at theoretical level, and a practical tool box for addressing the needs of the direct beneficiaries (individuals, groups, organizations) whom educators are focusing on. As underlined by Repko [3], being able to "think and act effectively on complex problems" includes the ability to overcome the so-called 'silo perspective', namely a tendency to see the world through the lens of a specific discipline.

2. BACKGROUND

Interdisciplinary competence is an academic goal that can be hardly acquired without a systemic vision of the curriculum; in this direction the Quality Assurance Group, within the degree course "Education Science", has activated periodicals meetings to offer the opportunity to all faculties to share their courses' syllabi and identify mutual lines of connections that can help students deeply comprehend core concepts and take a critical stand on disciplinary limitations. Having the chance to describe, explain and compare objectives, contents, strategies and evaluation methods is a first step for professors to embrace each other perspective, but communicating across disciplines implies also learning each other language, research methodology and didactical approach and co-teaching may represent a step forward to handle a successful interdisciplinary collaboration and teamwork.

Co-teaching is a widely investigated practice in the interdisciplinary literature and refers to two or more trainers (teachers/educators/professors) who share the design and implementation of their teaching activity with reference to a whole course or a part of it [4, 5].

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3. RESEARCH METHODOLOGY

The present study reports the experience of a project-based learning (PjBL) co-taught workshop, a teaching/learning unit developed across different courses in the socio-pedagogical curriculum. Each experimentation (Table 1) was conducted by the same team of two professors with the integration, in A.Y. 2023-2024, of a third colleague of a discipline (Interaction Design) of the second-cycle degree course.

Table 1. Synthesis of the interdisciplinary PJBL 4-year multiple case-study.

Academic year	Involved disciplines	PJBL outputs
2020-2021 2021-2022	Intercultural Pedagogy, Instructional Technology, General Didactics	Multimedia teaching plan
2022-2023	Intercultural Pedagogy, Instructional Technology, General Pedagogy	Video learning unit
2023-2024	Intercultural Pedagogy, Instructional Technology, Interaction Design	360-degree virtual tour

PjBL was, here, used to activate a learning process in which students, working in small groups, were fully engaged in authentic projects and in the development of a final output which should reifies the interdisciplinary objective of the workshop. PjBL studies show a positive impact on students' academic achievement both in terms of self-efficacy [6] and cognitive and behavioral outcomes [7].
Students' perspectives, perceptions and reflections were collected through observations, reflection papers and open discussions as a set of qualitative data and analyzed as a multiple-case of four different cohorts with the aim of eliciting students' experience in terms of acquired skills within group projects and related PjBL outputs with the mediation of a joint interdisciplinary support of their professors.

4. RESULTS AND CONCLUSIONS

The multiple-case analysis has shown how a co-taught workshop within an interdisciplinary project-based learning (PjBL) task helped students develop soft skills (e.g., communication, collaboration, negotiation) useful to reach a deeper interdisciplinary vision of their projects. Moreover the study highlights the impact of co-teaching practices on challenges in the use of the PjBL approach at university level.

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Student Inclusion in Action: Applying Scientific Research-Based Learning and Team-Based Learning

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Keywords: Research-Based Learning; Team-Based Learning; Innovative Learning Methods; Higher Education.

EXTENDED ABSTRACT

In contemporary higher education, the development of critical thinking, problem-solving, and research skills has become increasingly important in a world flooded with information. The constant growth of misinformation and pseudo-knowledge demands that students not only absorb knowledge but also understand the processes by which it is created, verified, and applied (Pourhejazy et al., 2024; Wimmelmann et al., 2024). This paper examines the potential of integrating Scientific Research-Based Learning (SRBL) and Team-Based Learning (TBL) as a combined pedagogical approach to enhance student engagement, critical thinking, and problem-solving in higher education. SRBL places an emphasis on active student involvement in research, allowing learners to create knowledge and apply scientific principles. TBL, meanwhile, is centred on collaboration and peer feedback to solve complex problems. Together, these methods foster a dynamic learning environment that prepares students for real-world challenges by promoting both individual inquiry and teamwork. The study draws on constructivist learning theory to review existing literature and case studies, demonstrating the effectiveness of combining SRBL and TBL across various academic disciplines. SRBL encourages students to investigate, analyse and apply research findings to real-world problems, while TBL enhances interpersonal and leadership skills through structured teamwork. The combined approach facilitates deeper comprehension of complex concepts and enhances the capacity to critically evaluate information and collaborate effectively. The theoretical analysis' findings demonstrate that the combination of SRBL and TBL leads to enhanced student learning outcomes, including improved critical thinking, research skills and the ability to discern credible information in an age of misinformation. Professors play a crucial role in facilitating this approach, acting as mentors and providing guidance throughout the research and collaboration processes. The integration of SRBL and TBL not only improves academic success but also prepares students for professional environments that require interdisciplinary knowledge and teamwork.

Moreover, the paper employs a case study methodology to illustrate the practical applications of SRBL and TBL. It presents a sample of cases from practice, drawn from the experience of Mykolas Romeris University, which demonstrate the application of SRBL and TBL. The findings of the case studies indicate that inclusive learning approaches facilitate exemplary learning outcomes and enhance the acquisition of comprehensive knowledge and a profound understanding of the subject matter.

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Exploring the institutionalisation of Service-Learning at the Universidad de Las Palmas de Gran Canaria

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Keywords: University Service-Learning, institutionalisation, ULPGC, educational innovation.

1. INTRODUCTION

Higher education institutions are currently undergoing a process of adaptation to societal demands, which entail adopting greater social responsibility. In this context, Service-Learning (SL) emerges as a key methodology focused on Global Citizenship Education, integrating learning, research, and community service, with the aim of addressing collective social needs in a sustainable manner [1]. In Spanish universities, SL has experienced rapid development since the 2000s, leading to the establishment of a political and organisational framework responsible for its promotion and dissemination. Although it can be argued that the consolidation of SL within universities is in a mature phase, it is generally considered that its institutionalisation still presents certain shortcomings [2].

Within this framework, the Universidad de Las Palmas de Gran Canaria (ULPGC) is currently in the midst of institutionalising SL. The primary objective of this study was to conduct an exploratory qualitative investigation using deductive analysis of the SL initiatives developed at the ULPGC that contribute to its institutionalisation. Through this analysis, the aim was to provide a critical evaluation of the current situation, identifying its strengths, weaknesses, and areas for improvement. This evaluation helped to pinpoint the opportunities and areas for enhancement in the institutional consolidation of SL at the ULPGC.

2. METHODOLOGY

The research method employed in this study is the case study approach, applying Programme Theory, which is operationalised through a proposed model of variables designed to explore the SL initiatives that have been implemented at the ULPGC. This is achieved through a hypothetical-deductive analysis. The variables adopted include the commitments outlined in the institutional declaration Strategy for the Institutionalisation of Service-Learning at the ULPGC (*Estrategia de institucionalización del Aprendizaje-Servicio-ULPGC*) [3] and Furco's [4] model for the institutionalisation of SL in universities.

The research process involved three methodological phases: 1) The preactive phase, which established the theoretical framework and the following two research questions: a) What actions are being promoted at the ULPGC in relation to the institutionalisation of SL?; and b) What are the strengths, areas for improvement, and opportunities for advancing the institutionalisation of SL at the ULPGC?; 2) The phase of data collection on SL initiatives at the ULPGC, drawing on various sources (official ULPGC website, members of the Educational Innovation Groups GIE-09 and Cooperation Group GEDE-ULPGC, participants in SL courses and projects); 3) The analysis phase, focusing on four key areas for the institutionalisation of university SL as outlined by Furco [4], alongside the commitments set out in the Strategy for the Institutionalisation of Service-Learning at the ULPGC (*Estrategia de institucionalización del Aprendizaje-Servicio-ULPGC*) [3].

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3. FINDINGS AND DISCUSSION

The analysis of the institutionalisation of SL at the ULPGC has been based on these two diagnostic tools, namely the Strategy for the Institutionalisation of Service-Learning at the ULPGC and Furco [4], aligning this author's key aspects [4] with the ULPGC's six commitments, leading to the identification of the following strengths and weaknesses:

1) Alignment between the institutional mission and SL objectives: the mission, vision, and values of the ULPGC are congruent with the principles of SL, and the institutional, regional, and national regulatory frameworks support its implementation; however, this methodology is not explicitly included in the ULPGC's Strategic Plan.
2) Community engagement and partnership building: this corresponds with the commitment which emphasises the visibility of successfully evaluated SL projects; the key SL actors are primarily local, receiving recent support from the Spanish University Network for Service-Learning (*Red Universitaria ApS[U]*); five regional seminars and one national and international conference have been organised; however, the initiatives are still predominantly led by teaching members in an unsystematic manner, without institutional certification or validation.
3) Academic aspects, which cover four institutional commitments related to SL: a) recognition of SL in the DOCENTIA-ULPGC programme: SL is recognised as an innovative teaching activity, though there is no explicit formal recognition for it; b) development of training programmes for teaching staff in SL methodology: seven specific training courses on SL have been conducted between 2012 and 2023, although this development has been intermittent, reliant on the initiative of the Cooperation and Educational Innovation Groups (GEDE-ULPGC and GIE-09), and contingent upon the institutional prioritisation of SL in policy cycles; d) support for SL projects within the framework of teaching innovation: the first call for inter-university educational innovation projects between the ULPGC and the University of La Laguna (ULL) is very recent (2024) and is not exclusively focused on SL; ULPGC's adherence to the Research European Reform University Alliance (RE: ERUA) presents an opportunity for promoting SL, as it recognises SL as a strategic methodology; e) healthcare and civil liability coverage in SL projects: coverage is only guaranteed for projects embedded within curricular internships, and no specific framework exists for SL activities involving external entities.
4) Structural and programmatic aspects for advancing and sustaining SL: this aligns with the commitment f), which concerns the creation of stable structures to support the planning, execution, and monitoring of SL projects. However, no institutional structure currently exists to promote SL actively.

4. RECOMMENDATIONS AND CONCLUSIONS

The conclusions of this study regarding the four key aspects of the institutionalization [4] of SL lead to a series of recommendations: 1) strategic integration of SL: the ULPGC has shown an increasing commitment to SL, incorporating it into its institutional declarations; however, as it is not embedded in the university's strategic plan, it is necessary to develop an action strategy that allocates the resources required to address the institutional challenge of promoting SL in a sustainable manner; 2) building synergies and partnerships: there is a significant need to foster synergies and partnerships between the university and external organisations, such as public administrations and civil society entities; 3) academic recommendations: it is recommended that a specific section for SL projects be integrated into the DOCENTIA-ULPGC programme; additionally, the establishment of a stable structure to ensure the continuity and systematic delivery of training, proper evaluation, and certification of SL projects by a qualified technical team is essential; specific calls for SL projects should be launched, alongside efforts to identify funding sources and partnerships beyond competitive educational innovation project grants; moreover, a mechanism must be established to guarantee health and legal liability coverage for all participants in SL projects; 4) creation of stable support structures: the effective management of the aforementioned commitments requires the establishment of a stable organisational structure, in the form of a committee, unit, directorate, or office dedicated to SL, as is already present in other Spanish universities.

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Law as Social Art: a New Path for Research and Teaching

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Keywords: interpretation, creativity, didactics, education

EXTENDED ABSTRACT

1. INTRODUCTION

Legal system is a process in continuous becoming, including cultural material that is both result and factor of human evolution. Consequently the object of law is not only the interpretation of principles and rules, but also the varied world of human facts. This surplus of culture can be called 'new legal anthropology'. Through studying of humanities, the jurist acquires the living representation of human evolution, that is, the human view of the world that can be observed according to a plurality of mutually fertilising criteria: historical, philosophical, economic, religious, linguistic and, of course, legal, in the twofold diachronic and synchronic dimension. In this framework, art plays a specific and decisive role, since its relationship with the legal sphere touches the soul of law, that is, the art of interpretation. Art takes as its reference the organic-spiritual articulation of human being and represents human nature through intuitions and ideas. It celebrates human creative act that goes beyond the description of the 'given' and provides the keys for unlocking the horizon of the imagination and of the interpreter's moral fantasy. The jurist is an artist when he manages to grasp the unrepeatable intuition of an original solution based not on a partial assessment of reality nor on a one-sided perspective, but on the ability to consider the unity of complexity provided by the unity of human nature. Alongside the organic element, human beings present the spiritual element that drives them to be free. Therefore there is an evolution in the very concept of law corresponding to the evolution of human being that the jurist must consider. Contemporary law cannot ignore or nullify human dignity, i.e. human vocation to pursuit freedom. This is the perspective that we intend to adopt in the study of law: that is, to consider law as a social art, since the special purpose that law sets itself is to ensure the material and spiritual well-being and progress of human being and peaceful coexistence. The aim of this project is to develop a transdisciplinary research method that realises a dialogue between law and the humanities, as described above. This method, constituting an example of innovative didactics, will be applied to teaching in addition to research activities.

2. METODOLOGY

The methodology consists of developing a new legal anthropology, which follows a different path from previous studies (such as, for example, that of Rodolfo Sacco). This methodology uses the following techniques: the opposition-identity dualism; the creative process shared by the artist and the interpreter. Regarding the use of the first tool, we can observe that human nature, knowledge and art are closely linked. Man is led to question himself out of a desire to know the world and himself. It is precisely the opposition to the world, to 'something else', that generates the *separation* expressing the tension towards knowledge. From this opposition derives the concept of *identity*: at this moment human being is a creator; experience is followed by knowledge, in the opposition the polarities of unity are discerned. Human being finds the explanation in contraposition, never losing the feeling of belonging to the world. This feeling produces the aspiration to overcome contraposition and to rediscover the connection with what is outside human nature. Regarding the instrument of creativity, whenever the individual makes use of it, he becomes an artist, since he is able to follow the process that, without breaking natural constraints, leads him to find moral laws, that is, human laws created by man for himself alone. The mission of law is to ensure the feasibility of this artistic path for all; hence we consider law as social art. Since the focus is on human creativity, the jurist must take this process into account and adapt his or her actions to legal thinking. Therefore, we can say that law through interpretative art can make man free. The research methodology presented here is based on an artistic process of reconceptualisation: separation and reunification of concepts/keywords through a mutual fertilisation between the humanities and law. The aim is to provide a methodology that, by activating cultural and social change, can make the creation of a human legal system feasible. It is a methodology that is not based on the personal ethics of the jurist

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or on the ruling political group conception, but human sciences-based, in the sense that it considers humanities as an integral part of the meaning and sense of legal categories. Humanities are not part of the meta-legal world, but the reasons of the legal system. Disciplines are not autonomous but interact among themselves through border relationships and connections, that represent the common objects of study. The focus on context and the plurality of dimensions inherent in each concept determines a new approach to the object of work for the University professor, in the capacity of both researcher and teacher. In relation to the second profile, the use of the described method for preparing lectures influences students' learning processes, as will be demonstrated by examples of lectures on 'will' and 'learning'. In addition to these examples, the article also includes a report of a transdisciplinary integrated didactics lesson conducted at the University of Macerata: it represents a concrete classroom experience of the described method. For this reason, the choice in favour of transdisciplinarity is functional to increasing problem-solving skills and orientation in the complexity of reality.

3. RESULTS AND CONCLUSIONS

The process of reconceptualization enriches and expands the semantic area and opens up new fields of legal application. Using this method generates a dual cognitive and communicative feedback, referred to here as a 'feedback loop': it concerns both the relationship between research and teaching (first cycle) and the relationship between teaching and learning (second cycle). 'New legal anthropology' approach leads to an openness towards different cultural experiences, inclusion of diversity and enhancement of the peculiarities, with consequent reduction of negative phenomena such as of discrimination, exclusion, inequality. The jurist assumes function of promoter and facilitator of cultural change through the acquisition of a juridical methodology including the essential questions and needs of humankind, such as, for example: free and dignified existence, motivation in work, the development of human creativity, the revaluation of exchange in the perspective of solidarity, the valorisation of use through talent and vocations, the re-functioning of money in the price circuit. This methodological path can also be taken into consideration by the humanities, which can draw new connections from the dialogue among themselves and the connections with law. Any student, who is trained in a method that values the person as such, according to a plurality of strongly interconnected cultural aspects, is capable of approaching reality in a more critical, comprehensive and inclusive manner.

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The physical theatre at the core of language learning

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EXTENDED ABSTRACT

The aim of this contribution is to provide an insightful didactic reflection on a long-running pedagogical experiment (2014-2024) conducted at the University of Paris 8 as a result of the collaboration between the Language Centre and the Theatre Department. Learning foreign languages through the arts, and more specifically through theatre, is an innovative approach that seeks to overcome cognitive barriers while providing learners with interactive, creative and engaging experiences. The course "*L'Italien à travers le théâtre*" is intended for students' specialists of other disciplines, of all levels and who have never studied Italian before (A1.1 and A1.2 levels). It is designed with the conviction that, from a pedagogical point of view, the use of techniques specific to the field of theatre such as acting, improvisation, diction and memorisation, are particularly effective cognitive drivers for language learning. In addition, the various uses of rythme, space and mask make learners' performance more enactive and the learning experience more poly-sensory. First, we will describe the course's general set-up, drawing attention to its strengths and weaknesses; then, based on the comparative study of the results obtained in terms of learning the written and spoken language, we will discuss the specific nature of the use of physical theatre, how it works and what its objectives are.

Keywords: language learning, physical theatre, learning by doing, creation

1. INTRODUCTION

Research in the field of language didactics is increasingly is increasingly incorporating the use of artistic practices into the learning of modern languages, particularly the visual arts. In this sense, the arts provide a unique bridge between the first language and the second one. By appealing to the sensory and emotional dimensions, they provide learners with a more personal and profound grasp of the language. The thread that guides our study is that of learning Italian for beginners, based on an innovative experiential device that puts didactic and epistemological reflection at the heart of its implementation. By pedagogical innovation, we mean the innovation that is advocated by Puozzo (2022) and which aims to challenge existing teaching practices and consubstantially adopt three levels of co-construction of knowledge: interdisciplinarity, the project approach and collaboration. The suggested educational innovation involves an approach that : 'It is not about producing a new object, but about an ethic of personal development and inclusion in a future project' (Puozzo, 109).

The challenge is twofold: to respond to an institutional demand for the design of innovative projects and to imagine, based on heterogeneous field realities, pedagogical devices that could enable learners to acquire knowledge, following a personalized progression and a learner-centered approach. Our study therefore relied on an innovative device, a long-term pedagogical experiment (2014-2024) conducted at the University of Paris 8 thanks to the collaboration between the Language Center and the Theater Department. Learning foreign languages through the arts, and more specifically through theater, is an innovative approach that seeks to overcome cognitive barriers while offering learners interactive, creative, and engaging experiences. Indeed, theater, for example, offers a safe space to experiment and express oneself both individually and collectively, while poetry fosters an intimate connection between the learner and language. Theater increases learners' motivation through its playful aspect, which promotes an intrinsic motivation essential to language learning, according to Malone and Lepper (1985).

2. METHODOLOGY

First, a state-of-the-art review will be conducted regarding the use of innovative methodologies in foreign language teaching, with a specific focus on the integration of the arts. This analysis will aim to highlight the uniqueness and innovative nature of our pedagogical approach through the use of theatrical practice. Secondly, the focus will be on the experiences and insights that, around ten years ago, led to the conception and implementation of the course *Italien à travers le théâtre*. During this phase, special attention will be given to the role of the body, as one of the underlying hypotheses of

our study is that learning passes through the body; it takes place with and thanks to the body. This is particularly relevant since, as Paolo Torresan and Maria Simona Morosin have demonstrated, meaningful memory tends to remain active and accessible longer than memories created using a single sensory channel. Finally, the specific structure of the course and its objectives will be presented and analyzed, highlighting its tripartite framework. This configuration enables students, through theatrical practice, not only to acquire a solid foundation in grammar and communication, but also to develop targeted and transversal skills, such as: Communication (exchanging ideas, listening, informing, explaining oneself); Cooperation (collaborating, working in a team, participating); Creativity (imagining, adapting, proposing improvements); Curiosity; Decision-making; Initiative; Rigor. The production of a play is a collective endeavor that demands unwavering commitment from the entire group on multiple levels. Throughout the process, the development and acquisition of the aforementioned skills are continuously required.

3. RESULTS AND CONCLUSION

In conclusion, it is important to emphasize that the cognitive and affective dimensions solicited in theatrical play, both for oneself and for others, encourage learners to form rich and lasting mental representations of the target language. As Patrick Anderson (2003) reminds us, learning a foreign language is above all a sensory experience. Indeed, it is the sounds, rhythms, and intonations that promote immersion in a new culture. As we have seen, this sensory dimension proves essential for successful language acquisition, particularly for beginner learners. This is why a large part of the students' interest in this course seems to lie in the fact that theatrical practice is not limited to a simple pedagogical tool. It also becomes a learning field in its own right, offering an aesthetic dimension that defends the idea of a theater accessible to all. The use of physical expression and gesture thus makes it possible to overcome not only cultural but also linguistic barriers and to find oneself in the great theater of the World.

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"HR: rush for practice" - an innovative teaching approach to support of the learners
(good practices at New Bulgarian University)

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Keywords: applied knowledge, practical training, cooperation between education, business and science, coaching.

1. INTRODUCTION

In the report, I present an innovative teaching approach "HR: Rush for Practice" at NBU, which combines new forms of learning such as the "flipped classroom", working in a virtual team via Wiki, team coaching and mentoring by academic teachers, student online discussions with the participation of mentors and moderators - professionals from the practice; with already tested Moodle functionalities and techniques such as asynchronous discussions, electronic assignments and feedback, tests and surveys, provision of electronic multimedia resources, virtual classroom. The results of the application of this approach over the period of 3 semesters (two academic years - 2022/2023 and 2023/2024) are investigated, where theory meets practice, where knowledge is applied to the real challenges of the HR function of selection and evaluation through digital gaming Pleggi model based on psychometric tests. At its core, "HR: rush for practice" at NBU is project-based learning and an innovative interdisciplinary form of teaching. By participating in this learning project, students take a serious step forward in their preparation for effective people management and their professional development. **The object** of the innovative form of teaching is all students studying psychology, management, human resources management and economics in the relevant specialties offered by the New Bulgarian University. **The subject** of the innovative form of teaching is the process of learning through an open dialogue between business, students and science in a real and virtual environment, giving the opportunity to achieve an optimal symbiosis between theoretical training and practical knowledge, based on the "learning by doing" method.

The main goal of the innovative form of teaching is, through a new, modern style of learning and self-development, to achieve maximum connection of scientific theories of personnel selection and evaluation with practices in organizations. **The sub-goals** of the innovative form of teaching are: • Development of understanding of the influence of the environment on the recruitment and selection process in the organization; • Acquaintance with the legal and ethical norms of selection and evaluation of human resources; • Evaluation of the effectiveness of recruitment and selection methods; • Development of skills for working with various assessment tools for recruitment and selection; • Analyzing the factors that influence the selection and evaluation processes; • Awareness of the nature and specificity of processes for evaluating, attracting and retaining talents in the organization. **The tasks** of the innovative form of teaching are: • Application of already acquired knowledge from training courses in the field of human resource management (HRM) in a real work environment. • Acquisition of new knowledge from the practices of organizations from different industries. • Learning from the experience of others - representatives of organizations, mentors, teachers, students. • Learning by doing and experiencing from active participation in real talent recruitment, selection and assessment processes; • Acquisition of new skills in the field of HRM; skills related to business processes and communication; commercial skills; marketing skills; skills for working with various software systems and social networks; data analysis. • Evaluating your potential for work in a specific position, stepping on time-established scientific methodologies (psychometrics, neuroscience), modern technologies (Machine Learning, Big Data) and gamification;

1. METODOLOGY

The initiative "HR: RUSH FOR PRACTICE" at NBU launched an innovative approach to learning through the active participation of students in a real recruitment process for Generation Z in the form of a unique student competition. It starts with the presentation of the regulations for participation in the competition and acquaintance with the employers. He continues with the formation of teams of two students and the implementation of a specific assignment "Recruitment and selection of talents" under the guidance of mentors. This is followed by a preliminary selection of personnel for real open positions offered by employers, using a professional digital HR solution for assessing the potential of job candidates from generations Y and Z - Pleggi, The initiative ends with the presentation of the selection results, evaluation of the students' work by employers, mentors and academic

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professors. The initiative includes: learning through an open dialogue between business, students and science; change to a new, modern style of learning and self-development. This change is a stage of education at NBU that students undertake with their decision to join the competition. By participating in this learning project, students take a serious step forward in their preparation for effective people management and their professional development. There are numerous benefits for the students who participated in this project, but the more significant ones are: Gaining knowledge from the practices of organizations from different industries; Learning from the experience of others - representatives of organizations, mentors, teachers, students; Learning through action and participation in real processes of recruitment, selection and evaluation of talent; Acquisition of new skills in the field of HRM; skills related to business processes and communication; trading skills; marketing skills; skills in working with various software systems and social networks; Data Analytics; Assessment of their potential for work in a specific position, based on established scientific methodologies (psychometrics, neurosciences), modern technologies (Machine Learning, Big Data) and gamification; Students learn how to assess their potential and upgrade their standard CV so as to arouse the interest of employers; The experience gained during the initiative provides a competitive advantage to each student in his realization on the labor market; Opportunity to receive a job offer and internship; Opportunity for a prize from the prize fund of the initiative. The greatest benefit for students is not the high grade in the student book they receive for their work, but the acquired knowledge, developed skills, accumulated experience, which provide a competitive advantage to each student in his realization on the labor market or in initiating his own business.

Academic educators went beyond their traditional role as a teacher and applied a coaching approach in a virtual learning environment. Two different coaching approaches – non-directive and directive – have been applied. The great benefit of non-directive coaching is the student tasks full ownership of his own solutions rather than “doing what someone has been told to do”.

A survey form has been developed and presented to the student. The survey was administered by email.

2. RESULTS AND CONCLUSIONS

There is a positive trend towards engaging students with the learning goals and increasing their motivation to learn through the innovative approach (see Table 1). With 87 students (43%) more participated in the latest initiative than in the first semester. 79% of students successfully completed the project in the first semester, compared to 76% of the fourth semester, but only 33% of the first semester received an excellent employer rating and a job offer, compared to 100% of the fourth semester.

The innovative learning approach HR: rush for practice at NBU focused on the ICT (virtual classroom) and coaching was explored. Those methods are applied in order to achieve expected level of competences of the students and knowledge and skills transformation. The lecturers observe the student’s reactions and behavior via active learning methods and coaching have been used in the training process. The positives of the combination between active coaching and non-traditional learning platform to the learning process have been defined.

The study was undertaken with all 319 students from the HR: rush for practice at NBU. A survey form has been developed and presented to the student. The survey was administered by email. All participants submitted their final email survey. The issues addressed: the targets areas for improvement that the coaching was supposed to address, the extent to which the coaching was perceived to have accomplished its objectives, any subsequent impacts of the students improvements on their ability to achieve their performance objectives (and how the target areas for the coaching were related to achieving the performance objectives), whether in the absence of coaching the performance improvements would have occurred anyway.

The data collection planning allowed the program with couching approach to be evaluated at 4 levels: *Reaction, Learning, Application,* and *Impact*. ROI is not a part of the current study.

The proposed combination of innovative approaches and training methods are aimed at higher efficiency of the learning process. They are implemented in the model of training that is entirely oriented towards students in accordance with their needs and expectations, and support their development to achieve competence in the field of management. Training and coaching can work very well when used together. Coaching is an excellent way of helping students apply what they learn from a course to the practice. The proposed model for learning is responds to the new realities of the business environment using modern educational technology. Through an interdisciplinary approach that integrates learning content, communication culture, and technology, we aim to contribute to the advancement of effective and inclusive teaching practices.

The questions raised for future research can be addressed through continuous collaboration with international and global partners, through the exchange of best practices and knowledge sharing.

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UAEGEAN innovative pedagogical approaches: The bring your own device approach

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Keywords: Collaborative Learning, Bring Your Own Device (BYOD), Mobile Technology, University Pedagogy

EXTENDED ABSTRACT

1. INTRODUCTION

In the 21st century, where the goal of education is to cultivate critical thinking and active citizenship, and where information is available at any time and place through mobile devices, expecting generation Z students to attend a traditional, sterile lecture in a lecture theater—one they could easily watch from the comfort of their homes with a single click—is unlikely to capture their attention and motivation. Traditional lectures, when conducted in their conventional form, are no longer sufficient. Today's students, shaped by active and experiential learning during their school years, demand more engaging and participatory approaches. To address these emerging needs, university pedagogy can evolve beyond the traditional model, where instructors primarily transmit knowledge, by adapting to new demands and exploring methodological strategies that foster meaningful interactions and active learning during sessions.

This paper explores the application of the Bring Your Own Device (BYOD) approach in higher education, showcasing its potential to transform lecture theaters into dynamic spaces for interaction and engagement. The BYOD approach is not considered as a teaching method per se, but rather a model of integrating technology into the teaching practice and learning process when the classrooms are not equipped with computers, enabling students to use their personal mobile devices during lectures, turning traditional lecture settings into interactive and engaging learning environments.

2. METHODOLOGY

Our implementation of the BYOD (Bring Your Own Device) is grounded in social constructivist theories, which emphasize the importance of collaboration in learning, and connectivist principles that integrate the vast resources of the digital world into educational practices, positioning learning as a collaborative, networked experience shaped by digital tools and peer interactions. Students used personal devices for a variety of tasks aimed at fostering active engagement and co-creation. Techniques such as small-group brainstorming, snowballing, and De Bono's Six Thinking Hats were employed to encourage critical thinking and multifaceted problem-solving. Digital platforms, including Padlet, Canva, and Google Docs, facilitated collaborative activities and enabled students to actively construct and share knowledge. The students themselves developed the evaluation questionnaire, adding a reflective dimension to our action research and providing unique insights into their experiences with BYOD while expressing their own views on the approach and its impact on their learning experience.

3. RESULTS AND CONCLUSIONS

Our findings reveal that the BYOD approach significantly enhanced both student engagement and satisfaction. Every student in the course (100%) felt the course met their expectations, with 98% describing the teaching methods as "engaging" and 70% as "absolutely satisfactory." Enthusiasm for BYOD was high, with 64% of students expressing interest in expanding BYOD to other courses, and many remarking that the experience felt "different from usual school

approaches" due to the freedom to use their devices to explore and express their ideas. Additionally, students reported that collaborative activities enhanced their understanding, with one student noting, "we didn't just learn facts; we developed our ideas together." Although a small percentage (14%) indicated a preference for using computer labs, the feedback overall underscores the adaptability and inclusiveness of BYOD as a learning model.

This study confirms that BYOD, integrated with active and collaborative learning strategies, has the potential to revitalize university education by aligning academic settings with the technological realities of students' lives. More than just a cost-effective alternative, BYOD nurtures an open learning environment where students are encouraged to share perspectives and build knowledge together. In this model, learning is no longer confined to passive information absorption but is reimagined as an interactive, student-centered process. By expanding the BYOD approach, universities can create inclusive, engaging, and flexible educational experiences that meet both academic and social needs of students. Moving forward, further research could explore BYOD's impact on final performance across diverse disciplines and investigate how such approaches influence students' long-term professional skills.

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Synergy of Minds and Machines: An Action Research Study on ChatGPT's Role in Transforming the Learning Process.

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Keywords: Artificial Intelligence, cognitive development, ChatGPT, human-machine collaboration.

1. INTRODUCTION

This article aims to explore the effectiveness of AI in supporting or hindering student learning. Drawing on theories on multimedia learning [1] and the concerns regarding the shallow effects of the technology on cognition [2], this study examines the potential of AI to enhance learning experiences. The collaboration between human minds and machines in the learning process is critical. Technology-driven tools can personalize learning experiences, adapt to individual learning speeds, and provide immediate feedback. Furthermore, educational data mining and learning analytics can uncover insights about student interactions, learning behaviors, which can inform the design of more effective teaching strategies [3].

Despite a number of possible educational advantages from using AI, many researchers have argued that ChatGPT also presents significant downsides [4]. There's a risk of students becoming overly reliant on technology, potentially at the cost of developing their independent problem-solving skills. Given the current limitations of ChatGPT, students might experience the risk of using misleading information produced by this innovative application [5]. ChatGPT has been argued to have a harmful impact on students' development of essential skills, including critical thinking skills, problem-solving skills, and imagination as well as research abilities [6].

2. METHODOLOGY

The advent of new technology compels us to rethink pedagogical approaches, thus employing an action research methodology [7] seems appropriate. The theoretical framework is grounded in the revised Bloom's taxonomy [8] providing a structured approach to cognitive skills development. The planned intervention involved integrating ChatGPT into the preparation phase of an Oxford-style debate. The intervention was implemented with 104 undergraduate students enrolled in the BA in Management and Leadership program at SWPS University, Warsaw Campus. Two Polish-speaking cohorts and two English-speaking cohorts participated in the intervention, which took place in April-May of 2023.

Data was collected from qualitative observations and quantitative surveys. The tutor conducted systematic observations of specific aspects, selected for their capacity to be recorded and evaluated, such as: physical space, Chair/Table Layout, collaboration among students, social interactions, tutor support, preparation speed, presentation skills, argument quality. Students had the opportunity to express their views answering following survey questions:

1. To what extent can ChatGPT improve discussion and interaction in classrooms?
2. To what extent can ChatGPT provide valuable insights and perspectives during class activities?
3. What is the satisfaction level among respondents using ChatGPT in the classroom?
4. Should ChatGPT be used regularly in the classroom?

3. RESULTS AND CONSLUCTIONS

Survey findings reveal that while 62% of students acknowledged ChatGPT's ability to provide useful insights, only 38% felt it positively impacted classroom discussions. Only a minority (27%) supported its regular use. The classroom observations allowed to compare Human-assisted and AI-assisted learning process, identifying potential risks to cognitive development (see figure 1).

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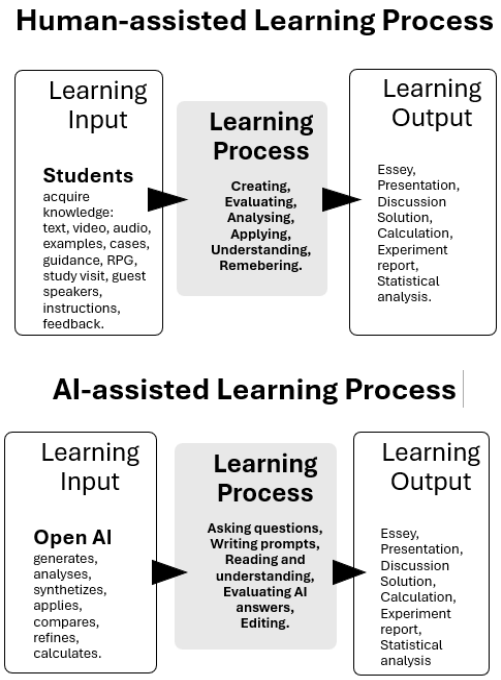

Figure 1. Comparison of Human-asssited and AI-assisted Learnig Process.

The research findings allowed to create a new theoretical model, HAALO (Human-assisted and AI-assisted Learning Output), in which AI augments rather than replaces human intellectual engagement (see figure 2).

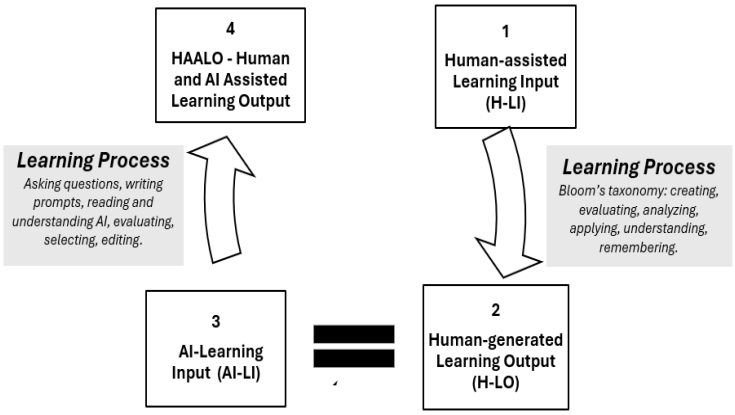

Figure 2. Synergy of Minds and Machines in HAALO model (Human and AI-assisted Learning Output).

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Embedded assessment in Higher Education: a case study

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Keywords: embedded assessment, assessment as learning, assessment in higher education, feedback.

1. INTRODUCTION

Research on assessment shows that forms of assessment are evolving and have different purposes, including assessment of, for and as learning. Assessment should be seen as a strategic process through which university students can actively improve their learning, rather than a standardized practice through which teachers merely verify and measure the knowledge that students have learned at the end of the course [1]. Therefore, in order for students to play an active role in the assessment process, there is a need to rethink assessment methods and practices by evaluating the role and use of feedback in the learning process [2]. Promoting the active role of students in the construction of the competences, required in a lifelong learning perspective, is taken into account in the "sustainable assessment" approach [3,4]. While research proposes the need to move towards sustainable assessment, the real willingness of secondary teachers to activate the pathways in this direction is very difficult to achieve. Particularly, in the Italian context [5], the difficulty lies in moving assessment from the assessment of knowledge, as a result of a learning pathway, to the assessment of the competences matured, using all the categories proposed by the 2005 Dublin descriptors. The difficulties experienced by university teachers can be understood as a consequence of the demand to assess elements such as 21st century competencies, which are by definition transferable to different contexts and visible in processes rather than in products.

A possible response could be "embedded assessment", an assessment that analyses the process and not only the product and, above all, that is carried out with various types of evidence in order to examine different perspectives and promote different attitudes [6,7]. It does not take place at the end of a learning process to somehow "close" a cycle and evaluate its products but is a continuous and pervasive pathway that is articulated throughout the learning action, analysing the processes activated and contributing to the construction of knowledge.

2. METHODOLOGY

Given the urgency to rethink and innovate assessment methods, especially at university level, in the academic years 2022-23 and 2023-34, we experimented with a new form of assessment in a first-year course of Master's Degree in Primary Education at the University of Macerata. We therefore designed an embedded assessment to support students' learning as they progress through the course and to encourage reflective thinking and awareness of their learning processes. The course entitled "Foundations of Teaching and Learning" consisted of 48 hours of lectures (with free attendance) and 20 hours of workshops (with compulsory attendance), which took place during the second semester of the first year. Each lecture was designed to follow approximately the same structure: 1. review of the previous lecture; 2. overview of the daily programme; 3. explanation of new arguments; 4. question and answer session; 5. small group or pair activities and plenary reflection/feedback; 6. individual reflection on the lesson by filling in a form (One Minute Papers - OMP) [8]. The workshop meetings were designed based on the framework of the lessons, but presented some differences related to the different scope and organization of the workshop: 1. overview of the daily programme; 2. recall of the arguments addressed in class and/or introduction to new concepts and tools; 3. modeling activities led by the tutors; 4, question and answer session; 5. micro-groups activities (video-analysis); 6. macro-group feedback from tutors and collective reflection.

Based on the course programme, which is divided into four modules, we decided to design three written midterm tests, to be administered at the end of the first three modules, in order to adequately alternate teaching and assessment sessions and support and guide students' study. All these tests were optional. As for the workshop, it concluded with a final individual exam based on a video analysis, like those carried out in the previous meetings. At the end of lectures and workshop, students have to take a final oral exam on the concepts related to module 4 and the key concepts of the course (if they have already passed all three midterm tests). Moreover, on the day of the oral exam, students who have not yet completed the workshop exam may take it in the same way. To reduce correction time, all written tests were computer-based and

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administered via Google Forms. The final grade of the course was thus determined by the results of the various assessment components: three midterm tests (optional); the workshop exam (compulsory); the final oral exam (compulsory). In line with the Dublin descriptors, we have designed the overall assessment of the course trying to balance and give sufficient importance/weight to each of them.

3. RESULTS AND CONCLUSIONS

To assess the impact of this embedded assessment, we first collected data on students' participation in the midterm tests. The participation of students in each academic year was really surprising and promising, considering that the tests were optional. Indeed, in 2022/23 a.y. almost all students took the three tests and also in 2023/24 a.y. the majority of students decided to participate. Another relevant outcome was the students' participation in the first session of the workshop exam. In both years, almost all students attended and completed the exam. Placing tests throughout the course encourages students to study the dense programme regularly, step by step, rather than all at once at the end of all lectures, as is often the case. They can discuss the results with the teacher, become more aware of their strengths and weaknesses, reflect on their study methods and deepen the arguments of a particular module that has proved more challenging. These aspects reflect the real essence of assessment as a learning perspective, as the assessment activity becomes an opportunity to learn and to autoregulate one's own learning, focusing more on the process than on the product. Furthermore, the decision of almost all students to take the workshop exam in the first session could be interpreted as a good confidence in their preparation after attending the workshop meetings.

Regarding the final exam, we decided to compare the data on student participation from our course (Course 1) with those from another first-year course (Course 2), conducted in the same semester. The assessment in Course 2 consisted only of a final oral exam and didn't include any midterm tests. Comparing the data collected from the first exam session for each year, Course 1 achieved a higher number of students who enrolled and passed the final exam than Course 2 in both academic years. This higher participation may be related to the different structure of the courses, which in Course 1 encouraged and enabled students to regularly study the topics covered in the lectures and thus to arrive at the final exam with a greater confidence and preparation. Finally, the regular compilation of the OMPs also showed a positive impact. Feedback from OMPs can be valuable for both teacher and student, promoting self-regulation processes and dialogical feedback [9, 10, 11].

To sum up the design of the course structure and assessment proved to be valuable. The regular use of reflection forms, filled in by the students at the end of each lecture allowed them to review what had been covered and to request follow-up or clarifications. The alternation between modules, activities and midterm tests encouraged regular and gradual study, dialogue feedback, and constant reflection on one's own learning path leading to a greater self-confidence. The many opportunities for discussion and reflection in plenary and in small groups enabled the students to develop and train their professional vision.

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Agile Team-Based Learning model in a Developmental Psychology course

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Keywords: Collaborative Learning, Project-Based Learning, Agile, Service Learning, Design Thinking

1. INTRODUCTION

Teaching methodologies used at universities require a major, evidence-informed innovative push, because the current state of the art is mostly based on tradition and intuition. This paper examines an educational methodology, which is a combination of interventions with robust empirical evidence, high estimated impact, and low estimated cost, as summarized in the EEF Teaching and Learning Toolkit (Edovald & Nevill, 2021; Higgins et al., 2022). Agile Team-Based Learning (ATBL), as this approach will be called, includes the following essential components: a) Collaborative learning approach, with students working together on activities in small groups, in a structured way. As students often need support, to be able to work together effectively, scaffolding in the principles of agile management practice is also provided; b) Feedback, with multiple sources of data, which include the instructor and peers, as well as beneficiaries of the service that the students are providing; c) Metacognition and self-regulation, where students learn specific strategies for planning, monitoring, and evaluating their learning.

The intent participation model is a "cultural gadget" (Brandl et al., 2023) originally observed in the social organization of indigenous groups of the Americas. Assembly-line instruction is the well know post industrial "teaching gadget", heavily influenced by the growing need to explain abstract concepts following the emergence of modern science. Both practices have their strengths and weaknesses. Collaborative learning and multiple sources of feedback, including peers, as well as real-life "customer" feedback gathered while engaged in a realistic, productive activity, are the clear strengths of the intent participation model. Expert provision of strategies for task planning and monitoring, as well as worked-out examples illustrating application of theoretical concepts, supported by frequent quizzing, are the strengths of the assembly-line approach. ATBL draws on both of these traditions, looking at their complementarity. The following sections of this report present this approach in more detail.

2. METODOLOGY

ATBL was evaluated in a Developmental Psychology course, offered to first year bachelor's in psychology students, at SWPS University (Warsaw, Poland) in 2023/2024 academic year. It was a 6 ECTS points module with fifty-four contact hours, offered for the first-year students. The course enrollment was about 125 students. Thirty contact hours were realized in a format classically known as a "lecture," with every student present in a large auditorium, and this was the way to focus on the assembly-line pedagogical model. Twenty-four contact hours were devoted to small group meetings ("workshop") of about twenty-five students each (24 hours * five groups in total), and this was organized with a focus on intent participation. Course was supplemented with a website, available at: Developmental Psychology (notion.site).

2.1 Large team meetings (LTM)

Large team meetings were similar to the "lectures" known from the assembly-line instruction, but with several important changes. In order to manage violation of expectations, students were informed about the reasons for not following the standard "lecture" format, with expository speech by the instructor. It was argued that this format is detrimental to their long-term learning outcomes, even if it can produce short-term satisfaction and an illusion of fluency. Students were informed that expository lectures inhibit knowledge creation and lead to lower examination performance. Evidence shows higher failure rates in expository-based courses than in active learning (Freeman et al., 2014).

2.2 Small team meetings (STM)

Small team meetings focused on collaborative learning, feedback and metacognitive elements. Students worked in teams of about 5-8 people, which is typical for agile methodology, as well as for diverse teams set up with a purpose to design and implement innovative A/B experiments in business settings (Kohavi et al., 2020). Teams were stable throughout the

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semester and students worked on a single, large project. To manage free-riding team member exclusion was allowed, with Lecturer mediation in conflict situations.

Students were asked to produce a meaningful, challenging, usable product, grounded in the knowledge from developmental psychology. Group workflow was managed using Kanban Boards. Those boards were used as focus points during STMs, with Lecturer being able to monitor progress, as well as judge the input of individual team members, since every student needed to have concrete tasks assigned to them on the Kanban Board. To foster mastery and not performance goals, it was emphasized that creativity, risk-taking, effort, as well as learning from mistakes will be rewarded. In practice, this meant placing emphasis on the number of design ideas, as well as rapid empirical testing of suggested solutions, instead of a long term (semester-wide) plans for a single design. Formal recognition of students' work was done privately, but the products were publicly highlighted.

3. RESULTS AND CONCLUSION

In the end a total of eighteen student products were created. As students had the choice to decide on the format for the project, a variety of options were chosen. The most popular being: YouTube videos, Spotify podcasts, social media accounts, Physical objects (a toy, a card game), as well as an interactive PC game. Student engagement was extremely high, and final products were of substantial quality, meeting the standards present in popular "hackathon" competitions or equaling semi-professional YouTube recordings. Each student group completed a webpage, which described their creative progress, as well as mistakes and problems, which could offer hints to subsequent cohorts (please see: Developmental Psychology 2023: Project Showcase (notion.site)). In conclusion, several elements seem to have worked in the ATBL methodology, in comparison with a standard lecture and seminar format: a) focus was heavily drawn away from the final examinations, knowledge recognition tests, and passive lecture attendance, towards making of the final product, application of knowledge, and far transfer; internal motivation related to product creation the usability of the final product in the eyes of potential users seem to have outplayed the external motivation for grades; Importantly, students not only plan a real-life project, but realize it, getting feedback on each iteration; b) students were capable of self-guiding their IT skills mastery, such as finding tutorials for video, audio recording, or game asset making; c) public showcasing of student products seemed to outweigh the lack of public "presentation grading", in terms of motivation; d) the biggest challenge was the lack of day-to-day habits in the use of agile methodology, and a tendency to fallback on the "waterfall planning" approach, where a single project is carefully designed over a long period of time, without much feedback, changes and experimentation. It turned out that the use of tools, such as the Kanban board, is necessary and facilitating team management is crucial, especially in mid-term, after initial project development; e) ATBL can be successfully realized by a single lecturer, and it's outcomes correspond with costly "hackathon" projects involving multiple business consultants. The conclusions of this single case study should be supplemented with a proper experimental A/B testing in the near future. Hopefully, the approach to educational design will soon exit a HiPPO phase (Highest Paid Person's Opinion, (Kohavi et al., 2020) with entrenched norms, beliefs, and paradigms, and enter an era of rapid and frequent experimentation.

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Educational Enterprise: a challenge for the university ecosystem in Bulgaria (an innovative approach for transferring knowledge in entrepreneurship and management to professionalism in practice)

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Keywords: interdisciplinary approach to learning, project-based learning, learning by doing, higher education in management and entrepreneurship

INTRODUCTION

Management of economic and public activities in the 21st century is to be based on paradigms, methods and approaches in collaboration with the goals and tools of Industry 4.0. and Industry 5.0. In view of the above, the European Commission [1] and the Ministry of Education and Science of the Republic of Bulgaria have developed recommendations and normative documents to carry out a planned transition to learning through practice, on the basis of which in the entrepreneurship and management educational process there had to be developed and introduced specialised theoretical-practical courses to study and apply methods and approaches optimally, responding to the essence of the elements of business intelligence systems, their applicability and expected results of their application. In 2011, New Bulgarian University (NBU) established the first Educational Training Enterprise (ETE) practical and research unit within the framework of higher education in management and entrepreneurship in the Republic of Bulgaria. In its essence, ETE is project-based training and an innovative interdisciplinary form of teaching in the field of higher education in the Republic of Bulgaria. The object of the innovative form of teaching is all students trained in entrepreneurship and management in the relevant specialties offered by NBU. The subject of the innovative form of teaching encompasses educational and training enterprises operating in a virtual environment in the form of a didactic model, enabling the achievement of an optimal symbiosis between theoretical training and practical knowledge, based on the learning-by-doing method. The main goal of the innovative form of teaching is to build a close link between the entrepreneurship and management scientific theories and the practical aspects and possible applications in a virtual environment that simulates optimally and appropriately the real business environment on a national and international scale.

Tasks of the innovative form of teaching: 1. Increasing students' motivation to acquire course materials; 2. Acquiring practical skills to set up and managing a new business, developing skills in critical and systematic thinking, decision-making and teamwork; 3. Building moral and ethical values in students in their capacity as future managers of economic entities; 4. Developing habits and mastering tools for fair competition; 5. Increasing the self-esteem of NBU students by creating conditions for their participation in international forums within the Practice Enterprise Network Worldwide (PEN Worldwide); 6. Integrating the courses studied at NBU and creating opportunities for students to participate in research projects of national and international significance.

Cooperation: In order to achieve optimal results regarding innovation and science-application collaboration, the training is conducted with the assistance of the Educational and Practice Enterprise Centre (EPEC) at the Ministry of Education and Science (MES) of the Republic of Bulgaria and PEN Worldwide.

METHODOLOGY

In its essence, an educational enterprise is a virtual business organisation with a specific subject of activity. The scope of activities performed by the students is in collaboration with the programme scheme in entrepreneurship and management as of the relevant cohort. The study period is three consecutive semesters (6th, 7th and 8th). In the sixth semester, students develop a business plan and present it to professors, business mentors, representatives of the university management and EPEC representatives at the end of the semester. During the seventh and eighth semesters, registration/re-registration of the educational enterprise is carried out, developing its structure and legal basis. Students perform activities comparable to those in an actual business organisation. They conduct commercial negotiations, conclude deals and transfer payments to merchants, suppliers and customers as well as salaries to their employees via BUCTBANK educational bank. Within EPEC, the framework, and PEN Worldwide, the world network, each educational enterprise carries out actual commercial and contractual activities in accordance with current national and international norms and legislation. The maximum number of students in each educational enterprise is up to 16. On a rotational basis, each of the students performs the main

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management functions in administrative units. At the moment, there are four virtual educational enterprises certified by EPEC and PEN Worldwide with vertically complementary subjects of activity (manufacturing, accounting and finance, transport and tourism) operating in NBU. In the context of the new realities in their practical work in the educational enterprises, students use an ERP system and professional accounting software. An office, an equipped computer room with 30 computer configurations, a secure Internet connection and visualisation technical means are provided for the training, which enables team work (face-to-face at NBU and online) and an optimal simulation of a real-life business environment. In order to achieve optimum performance, the ERP system has modules with integrated professional software used at a strategic, tactical and operational level in the business. The training is carried out by specially certified by EPEC university lecturers with extensive and long-term scientific and practical experience in the management of business structures.

A research methodology has been developed and applied, including fundamental and applied methods, including the following: Fundamental methods: Conceptual approach, Descriptive research design, Case study, Causal research design, Diagnostic research design, Sequential research design, Field research design, Systematic review, Survey. To develop research skills in students, the following methods are also applied: Research skills for your resume and cover letter, Research skills for the job interview. Applied methods: Technological, Scientific: Action Research, Causal research, Classification research, Comparative research, Cross-sectional research, Deductive research, Exploratory research, Flexible research, Inductive research, Mixed research, Policy research, Qualitative research. A time-proven methodology for collecting and archiving data from the educational process has been developed. Multifactorial annual and periodic analyzes of the collected data are performed. The results and the degree of achievement of the tasks of the innovative form of training are reported. After that, a decision is made which fundamental and applied methods will be used in the learning process.

RESULTS AND CONCLUSIONS

On the basis of the results obtained from the study of the principle of the Deming Cycle, annual changes have been carried out to the academic programmes and an update of the content of the lecture courses. The level of preparedness of the students has been significantly increased, as a result of which NBU has been recognised as a leading innovative institution in higher education in entrepreneurship and management in the Republic of Bulgaria. The learning process is organized within the autumn and spring semesters. The benefits of practical training in entrepreneurship and management can also be judged by the dynamics of the number of students, as well as their success rate. For the period 2012 - 2024, a total of 3936 students were trained. Conditions have been created for the participation of educational enterprises and students in the international events of EPEC and PEN Worldwide. Within the eighth semester, annually since the launch of the project, three educational enterprises participate in Young Entrepreneur international fair of educational enterprises, organised by the EPEC and PEN Worldwide. Within these forums, in a competitive environment, students demonstrate knowledge and skills for concluding business deals, conducting negotiations, building a suitable business environment, managing finances, presenting, etc. For high results achieved in practical training until 2023, more than 250 students were issued PEN Worldwide certificates, acknowledging high-level knowledge and skills mastered in entrepreneurship and management. Management and entrepreneurship education has to continuously adapt to the current characteristics of the digital business environment. Practical interpretation of the theoretical material should be enriched with digital tools used in real-life business. It is recommended that the number of specialised course hours in bachelor's degree be 50-70% of the total number, while at master's - 50-50%. The training should be organised in an interdisciplinary manner, thus allowing students enrolled in specialties relevant to business activities, like law, national and corporate security, etc., to participate in the project, i.e. educational enterprises.

For the purposes of Management 5.0, the teaching approach and policy should provide up-to-date professional knowledge and education in the basic values of the digital business society [2]. Digital transformation cannot be understood out of context. On the one hand, the evolution of society, scientific and technological progress, national characteristics and international communities and unions create new areas of human knowledge and imply a reassessment of the importance of education. But on the other hand, the good intentions of universities are often blocked by the constraints imposed by the cultural, social, civic, political and economic factors shaping the context. In online learning, the interaction between the trainer and the learners, as well as between the learners themselves, is of primary importance, which puts them in an active position. Delegating interactions and decentralization increase opportunities for cocreation and innovation in online learning. The implementation of various activities in the process of group work leads to the transformation of the learner into a partner of the teacher and increases his motivation to learn.

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Fostering Inclusive Innovation - how student's projects prepared for Universal Design classes shifted their mindset

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Keywords: Universal Design, Project-Based Learning, Inclusivity, Innovation

EXTENDED ABSTRACT

Introduction

This article examines the transformative potential of merging Universal Design principles with Project-Based Learning within the graphic design curriculum at SWPS University. The primary purpose of this work is to explore how these methodologies foster inclusivity, creativity, and collaboration among students. The hypothesis posits that integrating Universal Design into Project-Based Learning not only enhances educational outcomes but also prepares students to confront real-world challenges effectively. We aim to investigate the impact of these pedagogical strategies on students' mindsets, skills, and overall approach to design.

Research Methodology

The research employs a qualitative methodology, focusing on case studies derived from the curriculum. A cohort of graphic design students engaged in hands-on projects, including the redesign of urban spaces and the creation of personalized health management tools for individuals with diabetes. Throughout these projects, students conducted rigorous user research involving interviews, observations, and participatory design workshops. This iterative design process allowed students to gather insights from diverse community members, emphasizing the importance of empathy in the design process.

Results

The case studies reveal significant positive impacts on both student learning and community engagement. For example, in the urban redesign project, students identified barriers faced by children in public spaces, leading to innovative solutions such as inclusive playground designs and improved wayfinding systems. Similarly, in the health management project, students developed a smart insulin pen paired with a mobile application, enhancing the quality of life for diabetic patients. These projects not only deepened students' understanding of accessibility but also instilled a sense of responsibility to address societal needs.

Surveys conducted after the projects indicated that 90 percent of students felt more prepared to tackle inclusive design challenges in their careers. Students reported increased empathy, collaboration, and critical thinking skills, highlighting the effectiveness of Project-Based Learning in fostering real-world problem-solving abilities.

Conclusions

The findings underscore the importance of incorporating Universal Design principles into higher education to cultivate socially conscious designers. By prioritizing inclusivity and accessibility from the outset, we can envision a future where every individual, regardless of ability, can thrive. This integrated approach to learning reshapes educational landscapes, equipping the next generation with essential tools for impactful and inclusive design.

Moreover, the collaboration with local stakeholders, such as community organizations and government entities, amplifies the societal impact of these educational initiatives. These partnerships not only enrich the student experience but also lead to tangible improvements in community accessibility and engagement.

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Future Directions

As we look toward the future, we are committed to refining our curriculum to meet emerging societal needs and harness new technological advancements. Key recommendations include expanding interdisciplinary projects, integrating cutting-edge technologies, and weaving Universal Design principles into a broader array of subjects. This will ensure that inclusivity remains central to our educational framework, preparing students to become innovative leaders in their fields.

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Implementing an Ecosystem Approach to Developing Academic Oral Presentation Skills

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Keywords: academic oral presentation skills, ecosystem approach, learner agency, reflection-on-action.

EXTENDED ABSTRACT

Oral presentation skills – in the mother tongue and in the foreign language – are among the main building blocks of communicative competence as defined in the *Common European Framework of Reference for Languages (CEFR)* of 2001 [2] and 2020 [3], as well one of the key 21st century skills, which are crucial for success in higher education and the workplace [9]. We often assume that university students do not need any special instruction and/or explanation about effective presentations in academic context, believing they have had enough practice of doing oral presentation assignments before coming to the academia, and that good mastery of (foreign) language is enough in itself to guarantee success in presentation delivery. Students themselves are usually unaware of this deficiency in their communicative competence and academic skills kit until they face the disappointment of failing to present their academic work successfully. The present paper aims to share the author's experience of improving students' oral presentation skills by implementing an ecosystem approach to the educational process [6, 7] which nurtures the development of reflection-on-action learner strategies [5, 10, 11] and learner agency, i.e. "the feeling of ownership and sense of control that students have over their learning" [8], thus providing opportunities for the students not only to become more realistic and objective in their own self-assessment and regulate their own cognitive growth, but also to contribute to the learning of their colleagues in a spirit of cooperative interaction [12, 13]. Giving students access to the teachers' standards and criteria for assessing their oral presentational skills and scaffolding their conscious efforts [1, 8] to improve their communicative performance through experience [4] and constructive feedback helps students to maximize their potential and empowers them to adapt to the new requirements and flourish in the academic context.

The CEFR of 2020 [3] emphasizes on the important function that productive skills have in many academic and professional fields (e.g. the ability to make oral presentations, or produce written studies and reports), which explains the particular social value attached to them. The standards that have to be met when producing a sustained monologue or submitting a written product in this more formal context include not only linguistic quality, but also rhetoric organization of the arguments and fluency and articulateness of expression, especially when addressing an audience in real time (pp. 60–66). It is also argued that the skills in these more formal production activities are not acquired naturally, but are the result of literacy learnt through education and experience. It also involves learning the conventions of the genre concerned and the parameters defining successful performance.

Oral presentation skills are also part of the concept of 21st century skills, which educators and business leaders alike consider as important as content knowledge from core subjects and the most important driver of success both at college and in the workplace where students will have to apply in practice the theoretical knowledge they have acquired [9]. Although they are an obvious constituent of the communication skills, which is one of four major C's of the 21st-century-skills construct, the other three competences – critical thinking, creativity and collaboration – are interwoven in the ability to produce and deliver effective oral presentations.

In order to train good oral production skills, teachers need to adopt an ecological perspective to what happens in the classroom [6, 7, 8]. Learning and teaching do not take place in isolation, but within a complex and dynamic, ever-changing ecology, i.e. within a context defined by the interdependencies among all the elements of the setting, not only the physical/ material (like teaching materials and learning conditions at the educational institution), but also encompassing the actions and activities, the beliefs and attitudes of the teachers and the learners, the multilayered nature of their relationships and interaction [12, 13]. Each context contains affordances, i.e. potential learning opportunities [6, 7], and it is up to the teachers to capitalize on these affordances and create enabling conditions and offer practices for their learners to grow, i.e. to scaffold their path to success [1, 8]. The learning potential is better utilized if learner agency (the feeling of ownership and sense of control that learners have over their learning) is fostered and the effort is collective (everybody is respected and knowledge is constructed through sharing of ideas and collaboration) [8, 3].

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Agentive learners are motivated and engaged learners because they believe in their capacity to grow and know how to achieve it. They do not wait to be taught, instead they take the initiative, seizing and even creating opportunities to learn; they take risks, confident that they can learn from their mistakes; they are also resilient and persevere in order to overcome setbacks and adapt to the requirement of their learning environment [8]. Here are some of the ways in which teachers can facilitate the growth of learner agency through manipulating the pedagogical design of classroom experiences: they can discuss with learners the task goals and the standards for successful performance that they will use to assess them; they can give learners a choice in what to do and how to do it in order to achieve the learning goals; they can encourage learners to ask questions and take responsibility for filling the gaps in their knowledge; they can cultivate an attitude of inquiry/ a curious mindset and invite learners to cooperate in solving problems, thus learning from one another; they can encourage them to risk and experiment without penalizing their errors; they can help learners to self-correct and figure out for themselves the right answers (this in turn will boost their confidence in their own potential to learn); they can make use of learner-driven feedback, including peer-assessment (learners are more likely to respond positively to the constructive criticism of their colleagues than to teacher's feedback); they can encourage self-reflection at the end of the activity (so that learners become more aware of their own learning strategies, making sure success is not a strike of serendipity); teachers should start their feedback with comments on what learners managed to do successfully and try to focus on one or two major problems which they know learners will be able to overcome easily [8]. Thus empowered with a sense of purpose and agency, learners can achieve much greater success in their studies and have a far more rewarding learning experience in general, which will intrinsically motivate them to proceed learning even beyond the classroom.

Last but not least, it is should be emphasized that having a learning experience and learning from experience are entirely different activities [5]: “learning is the process whereby knowledge is created through the transformation of experience” (Kolb, 1984: 38). In other words, in order to capitalize on the affordances of the learning context learners should be encouraged to reflect on their on their learning experience – with the teacher's support and the cooperative contribution from the peers – and learn from it [4, 5, 10, 11]. In the present case study Kolb's (1984) four-stage reflective learning cycle – suggesting that effective learning occurs through a continuous cycle of experience, reflection, conceptualization, and experimentation – was employed to structure the activities aimed at improving university students' oral presentation skills.

The ecological perspective on the learning process allowed us to see the individual learners as socially connected and part of a complex and dynamic ecology of interconnected elements and a multilayered network of pedagogical interdependencies. Learner agency and learner growth were promoted by the teacher and nurtured in relations with other students. There was ample quantitative and qualitative evidence from our case study that students' academic oral presentation skills significantly improved and they were more motivated and invested in their learning. Students also felt prepared for the challenges and opportunities in life beyond the classroom, transferring the acquired skills and autonomy to new contexts, because when students take an active role in their learning and believe in their own capacity to grow, they are more likely to maximize their potential and capitalize on any learning affordance.

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Corpus Research on Multiword Discourse Markers for Raising Translation Awareness

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Key words: multilingual corpus; multiword expression; discourse relation; discourse marker; translation.

1. INTRODUCTION

The development, research and application of discourse annotated corpora is a comparatively new research area which includes the study of discourse markers and requires the competences of scientists not only in creating and annotating texts, but also in exploring the application possibilities of texts annotated with discourse markers [1], [2]. Effective discourse management in any language is characterized by clear connections between sentences and a cohesive, coherent language structure. However, in different languages, the connections and structure of discourse are ensured by different linguistic means. Various dictionaries and grammar textbooks introduce the peculiarities of words and sentences, and the connections of discourse layer still lack being discussed. It should also be noted that discourse research raises awareness of pragmatic categories, not just typically relying on grammatical lists of conjunctions to describe certain functions of text cohesiveness and coherence [3]. Discourse markers are tools of discourse management and their functions include signposting, signalling, rephrasing, etc. Their importance affects language production, communication, second language learning, and translation. Dobrovoljc has recently researched multiword expressions as identifying structurally fixed discourse marking multiword expressions in a corpus of spoken Slovene [4]. According to Mona Baker (2011), during translation, the realities of a situation, the realities of the context, as well as language-specific aspects need to be considered [5]. Thus, the question that needs to be answered empirically is: In translation, what are the shifts of multi-word discourse markers in their lexical form? Establishing what lexical forms multiword discourse markers acquire in translation helps to produce a sound basis for future research investigating the possible reasons for the particular lexical forms in translation.

The current research examined multiword expressions used as discourse markers in English social media texts. We used transcripts of TED talks and compared them with their counterparts in Lithuanian and Hebrew. Our research the objectives were: to create a parallel corpus to identify multiword expressions used as discourse markers and to analyse their translations in Lithuanian and Hebrew. Our focus was to investigate if multiword expressions remain multiword or become one-word expressions in translation to Lithuanian and Hebrew so that to raise translator awareness in translation studies.

2. RESEARCH METHODOLOGY

The research process included three stages – the parallel corpus creation, establishing the candidates of multiword expressions potentially used as discourse markers, the extraction and the analysis of a sub-corpus with the established multiword expressions as discourse marker candidates. We decided to use TED Talk transcripts because they are publicly available and provide appropriate material for parallel data. To create a substantial parallel corpus containing data in English, Lithuanian, and Hebrew, talk transcripts were extracted automatically using a language-independent method that permits parallelizing data for any researched language. The talk transcripts were automatically extracted by using a special code which ensured that English sentences with the candidate discourse markers from the theoretically-based list were extracted and matched their Lithuanian and Hebrew counterparts. The process of the compiling of the parallel corpus could be considered innovative because it allows parallelizing data from any researched language. After the corpus creation, the variations of the translations of discourse markers into Lithuanian and Hebrew were extracted automatically for comparative study, identifying the variations in translation.

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3. RESULTS AND CONCLUSIONS

The article discusses discourse research in relation to raising text coherence awareness in translation, and also to introduce the developed corpora resources. Therefore, the study first deals with the possibilities of expressing discourse relations by using multiword discourse markers as their linguistic realization in different languages, discussing possible choices of translators, taking into account the use of different linguistic means in translation. The article also presents the first research insights on comparing English, Lithuanian and Hebrew multiword discourse markers in order to understand translation tendencies at the discourse level.

English multiword expressions used as discourse markers demonstrate variability in Lithuanian and Hebrew translations: they either remain multiword expressions in the target languages or are translated as one inflected word, or omitted. In Hebrew translations, due to the nature of the Hebrew language, multiword discourse markers prevail and there is a clear tendency for translators to give preference to male derivatives [6]. However, in Lithuanian, there is a clear tendency for one-word discourse markers in translation. Lithuanian translations of pronoun-verb multi word expressions into one-word verb cases may be considered as almost word for word translations due to Lithuanian being a highly inflected (or null-subject) language [7] which fully represent the verb-pronoun cases. However, there are still cases where the subject is preserved in the Lithuanian translation and the discourse marker remains a multiword expression. Reflecting on why different discourse markers demonstrate different translation choices might be based on the nature of the target language into which the texts are translated, for example Lithuanian is rich in particles, and as the analysis has demonstrated, translators choose to integrate particles into discourse markers to mark the supplementary discourse expression. In addition, in English the gender is not expressed, thus when translating from English to Hebrew, the choice of the gender of the derivative is totally a translator's choice. However, since in Hebrew male gender prevails, translators automatically give preference to male derivatives. Another observation for Hebrew is that multiword discourse markers remain multiword because of the translator choice to rely more on word for word translation; while in Lithuanian there is a tendency to omit the pronoun by using an inflected verb which is how multiword discourse markers become one-word discourse markers.

Concerning discourse layer, based on the results of the current study revealing cases where translators chose to insert particles in Lithuanian and connectives in Hebrew which bear an additional discourse meaning in the translation, that translator's choices might be also guided by the internal discourse managing system of the target language.

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Innovation in Foreign Language Acquisition: Involving Students in Real-Life Projects

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Keywords: translation, project learning, flipped classroom.

EXTENDED ABSTRACT

The present study is analyzing the work of 5 students and their two tutors (the author of the article and a colleague in English language) in preparing tasks for a Competition in Applied Linguistics in French and English for High-Schoolers, at New Bulgarian University in Sofia, Bulgaria. Students had varying levels in French language and a steady B2 level across all semesters (2nd and 4th) in English. They all had Bulgarian as a mother tongue.

The aim of the Competition was to create links with high school students as possible prospective students for the Bachelor degree in Applied foreign languages for Administration and Management; to present the university and the possible professional outcomes for future students through a simulation of professional tasks to carry out.

The methodology used is closely related to the concepts of inverted or flipped classroom, project-based learning, cooperative and collaborative learning. The students were encouraged first to think about possible real-life tasks to give to the participants in the Competition. They chose three tasks: translation of commercial slogans; professional correspondence and machine translation post-editing (MTPE). For each of the three tasks, they chose samples on their own, on which they reflected and had to choose the most suitable for the task. After this they designed criteria for evaluation and carried out the assessment of the works themselves, once the competition was over. They were quite unanimous while assessing the works of the participants. During the awards ceremony, they discussed the results and presented, anonymously, parts of the participants' works in order to showcase best practices.

The results from the experiment were three well-designed tasks aimed at the aforementioned professional situations. During the stage of designing the tasks, the students had the opportunity to interact with each other and to build their own teams, which helped them in acquiring further skills in interpersonal communication and problem-solving. They had to improve their translation skills, their skills in researching information on the Web and their critical thinking. Overall, the tasks they created show a greater maturity in understanding key concepts of interlingual translation and conception of professional tasks.

The study's limitations were the small group of students; the few languages they spoke; the few tasks they managed to propose. In the future, the Competition may be extended to include a greater variety of languages as well as a more varied group of students in terms of language acquisition, so that the project has greater impact.

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Collaborative learning – model for designing social entrepreneurship education

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Keywords: collaborative learning, co-creation, social entrepreneurship, social innovation

1. INTRODUCTION

Social innovators are dealing with complex problems, the solution of which requires the involvement of various social actors. The need for reflection on the nature of inter-sectoral and inter-organizational cooperation in the area of social innovation was identified. In the area of social innovation, the importance of collective action has been recognized by researchers as significant [1,5,9]. Social innovation is referred to as the "collaborative concept", in which Ziegler 2017 [11] describes the joint work of actors with different perspectives on perceiving a social challenge. The aim of the actions taken is to solve a problem that is complex and multilaterally dependent. The actors are united not only by a common goal, but also by a shared system of values, which is a point of reference, especially in difficult or conflicting moments. Different perspectives are particularly clearly represented by actors from different sectors. Using the Quadruple Helix model Carayannis, Barth & Campbell 2012 [2] we can list four parties that participate in creating innovation: civil society, university, business and public administration. The complex challenges of today require the involvement of various social actors, including representatives of NGOs, academia, public administration and business, in the search for and implementation of solutions. In this context, the experience of research in the social innovation ecosystem may become the starting point for formulating assumptions and building the program of the educational faculty in the social entrepreneurship area.

2. METHODOLOGY

In the research projects conducted by the Authors so far, embedded in the ecosystem of social innovation, qualitative research methods were used [4]. Field research conducted in 2022 in a project, the results of which are presented extensively in this article, was based specifically on methods drawn from the tradition of ethnography and grounded theory. From April 2022 to August 2022, 29 interviews were conducted as part of the research. Among the research participants, two groups can be distinguished: a group of third sector organizations and a group of individual social innovators, including people who operate in an informal way (they gather in informal groups or operate independently). As part of the research, it was decided to select interviewees using the snowball method. As a result of the transcription of the research material, 391 pages of material for analysis were obtained. In the context of the description of the methods used to analyze the data, it is worth emphasizing that at the stage of developing the material, grounded theory links were used.

3. RESULTS AND CONCLUSIONS

Cross-sectoral and inter-organizational cooperation is one of the key strategies enabling the development of the social innovation ecosystem. We see that learning through intersectoral collaboration is very important and we design three models for designing education (Figure 1, Figure 2, Figure 3). Based on the conducted research, we suggest to present the intersectoral collaboration through the models that explain the process of collaborating, the benefits of it and methods of engaging participants. The first model describes the categories of stakeholder engaged in the collaboration. We see that quadralup helisa's model categories can be adapted to the needs of social entrepreneurship education. These are Practitioners (start-ups and business), NGOs and Incubators, Public administration, Academic experts and Civil Society (e.g. beneficiaries of the course). The reasons to engage such a variety of stakeholders are multiple and are presented on the figure below. First of all, it is about reaching for the most recent practical knowledge and knowing the best practices from the social entrepreneurship ecosystem. It is an opportunity to collect up to date information about existing programs that offer currently support to social entrepreneurship initiatives. Secondly, co-creation with stakeholders allows to engage them in educational processes, and create networks. Networks are useful for students and course beneficiaries and

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may be transformed into other forms, like mentoring programs. We suggest conducting the workshop and engaging stakeholders. The SUC model presented on Figure 3, describes the crucial steps to be taken during such workshops. It is: sharing experiences, searching for a common understanding of the topic (e.g. social entrepreneurship, or creating strategy for the initiatives, etc.), and finally co-designing the elements of the course. Such collected raw material should be adapted to academic conditions, proofed regarding its quality and included in educational programme. The model of intersectoral collaboration is a method of creating engaging and effective courses that allow students to enter the social entrepreneurship ecosystem. Moreover it enables emergence of social and business networks within which the students may gain a smoother transition to professional life.

As the research shows, the various manifestations of cooperation described can occur together or separately, depending on the key goal of the initiatives. It would be worthwhile to take action to identify the external and internal conditions of these processes (Kubów, Osterczuk 2024). The authors, noticing a number of interesting directions for further research, consider the identification and description of key transformative competences (Kubów 2023). This may be of particular interest to the community of practitioners involved in the implementation of initiatives, the community of educators popularizing the issues of social innovation, as well as to future social innovators who are interested in knowledge about the possibilities of developing competences valuable in the process of designing and implementing initiatives with a positive social impact. Including the described categories in educational programs prepared for social innovators may help to direct them towards the special role of cooperation on the way from idea to implementation, as well as to develop competences enabling activities in this area.

The level of complexity of the social challenges we face is growing. A huge opportunity for us - researchers and educators, is the possibility of combining the forces of different disciplines. Focusing on co-creation and cooperation of representatives representing different disciplines and sectors and the participation of practitioners in this process can lead to the production of important and useful conclusions that will help shape the dynamically developing ecosystem of social innovation.

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Cooperative and Collaborative Learning: Innovation and Internationalisation in Higher Education

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Keywords: collaborative learning, cooperative learning, ERUA, ULPGC, innovation, internationalisation

EXTENDED ABSTRACT

Tertiary education students face a world of local and global challenges, marked by constant transformations that are essential for their personal and professional growth. In response, universities must continuously revise and update their strategic plans to outline specific goals and encourage educational experiences that are interactive, personalised and student-centred. Such environments prioritise student agency, allowing learners to actively shape their educational journeys. This paper, emerging from the workshop for the Academic Innovation Manual (AIM) of the European Reform University Alliance (ERUA), provides a contemporary analysis of innovative active methodologies identified across the eight universities of the Alliance. A particular focus is placed on collaborative and cooperative learning approaches, which have been implemented across a range of disciplines. These methodologies, applied in onsite, online, and hybrid learning formats, demonstrate how multidisciplinary teamwork, peer collaboration, and engagement with external partners foster deep learning and professional readiness. Through case studies in the specific fields of Architecture and Engineering, and Arts, and Humanities at ULPGC - one of the universities in the ERUA Alliance- this paper contributes to ongoing dialogues about enhancing higher education practices, aligning them with global challenges, and preparing students to thrive in a rapidly evolving, intercultural, multilingual, and interconnected world.

1. INTRODUCTION

In the evolving landscape of higher education, teaching, innovation, knowledge transfer and research stands as foundational pillars that drive academic excellence and societal impact. These pillars are intricately linked to the internationalisation of education, which seeks to address both local and global challenges within the educational system, and therefore, within society.

More than 560 European higher education institutions have formed strategic alliances to promote a shared academic vision, emphasizing innovation, internationalization, and cutting-edge research through collaborative programmes. These alliances aim to enhance educational quality and foster global cooperation, ensuring a more interconnected and internationally competitive European Higher Education Area[1].

“Reimagining Higher Education” is the guiding principle of the European Reform University Alliance (ERUA)[2]. This goal advocates for a transformative approach to university structures and functions, emphasising innovative pedagogy, interdisciplinary curriculum redesign, inclusive learning opportunities, flexible learning formats and technology integration. It also highlights the importance of international collaboration, multilingual and intercultural student empowerment and sustainable practices.

This paper emerges from the Academic Innovation Manual (AIM) and addresses pedagogy and innovation in the context of ERUA. The ERUA Alliance, co-founded by the Erasmus+ Programme of the European Union, includes eight distinguished universities: Université Paris 8, University of the AEGEAN, Universidad de Las Palmas de Gran Canaria (ULPGC), Mykolas Romeris University, New Bulgarian University, SWPS University, University of Macerata and Europa-Universität Viadrian Frankfurt (Oder).

The objective of this paper is to offer a contemporary examination of cooperative and collaborative learning within the framework of internalisation in higher education. It aims to present practical examples of these approaches across various disciplines and university settings, exploring their implementation in onsite, online and hybrid formats for both undergraduate and postgraduate programmes. Through this analysis, we seek to contribute to the ongoing dialogue about enhancing educational practices and equipping to thrive in a dynamic global environment, as envisioned by the European Reform University Alliance (ERUA).

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2. METHODOLOGY

The benefits of cooperative and collaborative learning span the academic, affective, and social dimensions. Academically, students acquire high-level intellectual skills, improve their attitudes towards learning, and increase their ability to retain knowledge. They develop more complex thinking processes, analyzing problems from multiple perspectives, identifying connections, and synthesizing information from diverse sources. In the affective dimension, these methods promote greater motivation, involvement, self-confidence, and responsibility for the learning process. Socially, students develop essential skills for personal and professional growth, including the ability to relate to others, integrate into groups, and work collaboratively to achieve shared objectives.

In the ERUA Alliance, cooperative and collaborative learning practices have been identified as prominent active methodologies that are implemented across multiple disciplines and universities of the consortium. These methodologies, embraced by their potential to enhance student engagement and foster deeper learning, are implemented in fields such as Architecture and Engineering, Arts and Humanities, Health and Sciences, Law and Social Sciences and Sciences, covering both undergraduate and postgraduate programmes. Both approaches are performed in onsite and online environments. This section summarizes specific examples from the fields of Architecture and Engineering, and Arts and Humanities, illustrating how cooperative and collaborative learning approaches are integrated into higher education practices within the consortium.

3. RESULTS AND CONCLUSIONS

The case studies presented in this paper highlight how cooperative and collaborative learning approaches are being effectively implemented across a range of disciplines, including Architecture, Engineering, and Arts, and Humanities. These examples underscore the potential of such methodologies to cultivate deep learning, active engagement, and collaboration among students, while also providing them with invaluable opportunities for career development. Whether applied in onsite, online, or hybrid formats, these approaches create a dynamic and inclusive learning environment where students can work in multidisciplinary teams, engage in peer assessment, and collaborate with external partners. This not only enhances their academic experience but also prepares them for the complexities of the global workforce.

The European Reform University Alliance (ERUA), guided by its principle of "Reimagining Higher Education," offers a forward-looking framework for the future of higher education from an intercultural and multilingual perspective. Through its focus on interdisciplinary curriculum design, flexible learning formats, technology integration, and international collaboration,

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Combining Large Language Models and Ontologies to build a collaborative learning digital environment

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Keywords: Digital System, Large Language Models, Artificial Intelligence, TransDisciplinary Methodology

1. INTRODUCTION

In today's complex and interconnected world, academic disciplines cannot operate in hermetic sealed compartments, to the point that, to respond to the needs of contemporary societal challenges, knowledge creation and problem-solving require a TransDisciplinary (TD) approach that bridges the gap between distinct fields of study, both in education [1, 2] and research [3]. Collaborative Learning (CL), intended as an educational approach to teaching and learning that involves groups of learners, challenged both socially and emotionally, as they listen to different perspectives working together to solve a problem [4], has been identified as one of the possible drivers of TD education and research [5, 6]. In this regard, [7] provides an example of a collaborative learning environment by proposing a TD methodology with the intent of allowing jurists to enrich their interpretative skills and contribute to an "inclusive legal argumentation", by "contaminating" juridical concepts with arts and humanities. The book proposed a methodology where a group of scholars (from private law, roman law, art, philosophy, computer science, literature, drawing, and pedagogy) collaborates to identify key concepts within their disciplines and, through discussion, gives their own point of view and listen to that of the others, on the same object of study, building concept definitions that are "contaminated" from all the disciplines and interconnections among these concepts. As in collaborative learning in general, the effort is in the construction of shared knowledge across different disciplines [8]. In fact, it is required to catalogue, organize, and interpret the vast array of disciplinary definitions, with the risk that collaborative efforts can become fragmented and inefficient, which is one of the main reasons that boost computer supported collaborative learning [9]. To respond to these needs, in reference to the methodology described in [7], this paper proposes an architecture for a novel digital system designed to support such an approach by fostering collaborative learning and knowledge integration across disciplines. The system, composed of an ontology, an Artificial Intelligence (AI) component, and a User Interface (UI), addresses the need to transcend disciplinary boundaries and create TD definitions of key concepts. The ontology, intended in the computer science meaning (i.e., as a structured way to formalise and store the archetypes, their classification, their taxonomy, and, most important, their relations [10]) serves as a standardized thesaurus that organizes and connects concepts across diverse fields, providing a structured way to map interdisciplinary relationships. The AI component, powered by Large Language Models (LLMs, intended as AI models are trained on massive amounts of text data and are able to generate human-like text, answer questions, and complete other language-related tasks with high accuracy [11]), interprets researchers' natural language queries, retrieving pertinent concepts from the ontology and highlighting connections and definitions across various disciplines. This facilitates the automatic generation of ontologies and assists in identifying relationships that may not be immediately apparent to researchers. The user interface serves as an entry point where researchers can log in, pose queries, and visualize concept connections, fostering a deeper understanding of how different fields overlap.

2. METHODOLOGY

The proposed digital system utilizes ontologies as a collaborative learning platform to facilitate a TD approach, aligning with the humanistic principles of the suggested methodology through an AI-driven natural language interface. The system comprises three primary components, the ontology, an AI-based component, and a User Interface (UI). The ontology provides a structured framework to formalize and store archetypes, including their classification, taxonomy, and most critically, their interrelations [10]. By doing so, it minimizes the potential for misinterpretation of these concepts and fosters a shared understanding [12] among researchers employing the methodology. The ontology component is instrumental to build a standardized thesaurus of concepts, architypes, and definitions across different disciplines, proving a means to map the connections among them. The AI-based component incorporates a Large Language Model (LLM) to interpret researchers' queries expressed in natural language and retrieve pertinent concepts from the ontology, including the interconnections and definitions of these concepts across various disciplines. LLMs, recognized as computational models

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capable of comprehending human language [13, 14], have demonstrated significant proficiency in information retrieval [15]. Finally, the UI serves as the entry point for researchers to access the system, where they can log in, pose queries regarding concept definitions and relationships, and visualize the connections among archetypes across multiple disciplines.

3. CONCLUSIONS

The proposed digital system is designed to meet the essential requirements of collaborative learning by fostering interaction, knowledge sharing, and co-construction of meaning across disciplines. Through its ontology component, the system creates a shared knowledge base where key concepts from different fields are standardized, enabling participants to access and contribute to a common framework. The AI component, with its ability to interpret natural language queries, promotes seamless communication among researchers by retrieving interconnected concepts and definitions, thus supporting a deeper understanding of how different areas of expertise relate to one another. Additionally, the user interface facilitates real-time collaboration by providing an interactive platform where users can pose questions, explore connections, and visualize the relationships between concepts. The proposed system, not implemented yet, faces limitations in the lack of experimental data, and raises ethical concerns in terms of LLM biases and hallucination. Future work will address these issues, refining the system's architecture. Furthermore, the ethical considerations around the use of LLMs in academic research must be thoroughly explored.

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Collaborative spaces at the university – writing consultation from students for students: a collaborative space for academic writing

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Keywords: collaborative learning, peer tutor in writing, writing center, writing consultation

EXTENDED ABSTRACT

1. Introduction

This presentation explores the concept of collaborative learning in higher education, focusing on student-to-student writing consultations as a model for academic support. Collaborative learning, a process where individuals contribute their expertise and work together to achieve shared learning outcomes, has proven to be highly effective for knowledge acquisition, particularly in writing.

2. Methodology

I will focus on peer tutoring model, as introduced by Bruffee, highlights the importance of social interaction in learning environments, emphasizing that students often learn best from one another. Through writing consultations, both the consultant and the writer benefit from this collaborative process, developing skills such as critical reflection, academic writing proficiency, and active listening. This approach fosters a deeper understanding of academic content and promotes the development of problem-solving abilities and emotional and motivational aspects of learning. In this paper the writing consultation from students for students will be introduce to give other Universities the opportunity to think about implementing peer writing consultation as one model for collaborative learning. I am going to present the principles of the writing consultation from students for students and I will also tell the audience from my experience as former (one of the first writing peer tutor in Germany) and as director of the Writing Center about how the writing consultation from students for students works.

3. Results and Conclusion

Ultimately, I like to advocates for the creation of more collaborative learning environments in higher education, suggesting that institutional support, resources, and recognition of these formats are essential for their success.

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Collaborative learning in intercultural information literacy – the case of the Intercultural Perspectives on Information Literacy and Metaliteracy (IPILM) course

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Keywords: metaliteracy; collaborative learning; GLAID framework; illustrative case study

EXTENDED ABSTRACT

1. INTRODUCTION

The fast-changing landscape of higher education requires innovative methods to prepare students for the future job market and lifelong learning. As digital technologies rapidly transform knowledge creation, sharing, and application, educational strategies must evolve to develop critical skills like collaboration, problem-solving, and metacognitive reflection. Institutions must equip students to succeed academically and navigate the complexities of a globalised and digital world. Metaliteracy addresses these challenges by promoting critical thinking and collaboration in digital environments. It goes beyond traditional information literacy by fostering students' ability to engage in social media, responsibly create knowledge, and participate in intercultural contexts [1]. Metaliteracy helps students become adaptable, informed, and self-directed learners, essential for navigating today's digital age. Collaborative learning, another transformative approach, enhances cognitive and interpersonal skills in higher education. It encourages active participation, fosters critical thinking and problem-solving, and shifts the focus from teacher-centred to student-centred learning [2]. Through collaborative learning, students build confidence in addressing academic and professional challenges together.

2. METODOLOGY

This study employs an illustrative case study method to analyse how the Intercultural Perspectives on Information Literacy and Metaliteracy (IPILM) course fosters metaliteracy competencies within an intercultural context. The illustrative case study approach is appropriate because it provides rich, context-specific insights into the processes and interactions involved, contributing to theoretical generalization [3]. The IPILM course brings together students from diverse cultural and academic backgrounds and promotes critical information literacy, intercultural competence, and metacognitive reflection through collaborative learning. This course exemplifies an innovative learning model encouraging students to co-create knowledge in global, digitally mediated environments. Participants in the course engage in various collaborative activities that foster the development of metaliteracy skills, such as critical thinking, adaptability, and ethical content production in online settings [4].

3. RESULTS AND CONCLUSIONS

The *Intercultural Perspectives on Information Literacy and Metaliteracy* (IPILM) course exemplifies how metaliteracy competencies can be fostered through collaborative learning in an intercultural setting. Initially launched in the winter of 2019/2020 as a collaboration between the University of Hildesheim (Germany) and Symbiosis College of Arts & Commerce (India), the course has since expanded globally. The course promotes metaliteracy and intercultural competence by bringing together students from diverse cultural and academic backgrounds. Its core features, such as international group learning and a closing online conference, have been refined over time, and the course continues to evolve. The IPILM course has created an international community of practice, with instructors managing the organisational and technological infrastructure for transnational group learning. Participation is voluntary, with instructors integrating students from existing classes, making IPILM adaptable to different institutions' courses and administrative regulations. This flexibility makes it an appealing model for broadening students' global educational experience.

Using the GLAID framework [5], this case study explores key components of collaborative learning within the course:

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- **Interaction**: The IPILM course emphasises synchronous and asynchronous interactions facilitated by platforms like Moodle and BigBlueButton. Weekly live sessions and asynchronous group projects foster peer-to-peer collaboration across cultural boundaries, ensuring dynamic engagement regardless of time zone differences.
- **Learning objectives and outcomes**: The course aims to develop metaliteracy and intercultural competence by encouraging students to critically assess and apply information in diverse contexts. Learning outcomes focus on reflective learning, critical thinking, and collaborative skills. A significant feature is research presentation at an online conference, emphasising global perspectives on information literacy.
- **Assessment**: Assessment in IPILM is both formative and summative, focusing on group collaboration. Students create research artefacts, such as screencasts, which are presented at the final conference. Formative feedback throughout the course enables students to refine their work, emphasising individual and collective learning.
- **Task characteristics**: Tasks are designed to promote deep engagement. Each course edition includes new topics, such as the influence of AI on culture and politics. Groups define their learning objectives and select collaboration tools, encouraging students to synthesise diverse perspectives and produce meaningful artefacts.
- **Structuring**: The course follows a phased structure, beginning with onboarding and progressing through group work on artefact creation. Weekly sessions provide specific milestones, ensuring students stay on track. This approach promotes engagement and culminates in public presentations where students share their work as open educational resources.
- **Guidance**: Instructors provide continuous support through virtual meetings and feedback sessions, assisting with research methodologies and artefact presentation. This guidance is essential for navigating intercultural collaboration and ensuring high-quality outputs.
- **Group constellation**: Diverse groups, typically composed of six students from different cultural and geographic backgrounds, enhance the learning experience by fostering intercultural competence through collaboration.
- **Facilities**: The course leverages digital tools like Moodle, BigBlueButton, and OBS Studio to manage content, facilitate communication, and support artefact creation. Students also use platforms like Google Meet and Zoom for independent group work, ensuring flexibility and accessibility.

The IPILM course provided insights into the challenges and opportunities of implementing an international collaborative learning project. Involving students and instructors from six different institutions across countries, the project highlighted complexities such as navigating diverse educational systems and academic calendars, cultural differences, and varying grading systems. Despite these challenges, the course enriched students' learning by exposing them to multiple academic approaches, enhancing their intercultural competence and broadening their perspectives on metaliteracy. A continuous design improvement process led by instructors played a crucial role in addressing unforeseen challenges. Regular instructor meetings allowed for real-time adjustments to task complexity and pacing. The balance between synchronous and asynchronous learning activities was particularly challenging due to students' participation from different time zones. Instructors adapted by shifting specific tasks to asynchronous formats, ensuring meaningful engagement across geographical boundaries. Finally, cultural sensitivity and inclusivity were emphasised throughout the course. Instructors modelled respectful communication, and scaffolding activities ensured that all students, including quieter ones, contributed equitably to group work, creating a balanced and inclusive collaborative environment.
In conclusion, the IPILM course demonstrates the potential of combining intercultural and collaborative learning to foster metaliteracy in higher education. The lessons learned from this initiative highlight the importance of thoughtful design, flexibility, and feedback in preparing students for the demands of a globalised digital world.

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From Jury Participation in a Literary Prize to Exploring Literary Studies: Fostering Deeper Engagement with Literature

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Keywords: teaching literature; extracurricular project;

EXTENDED ABSTRACT

1. INTRODUCTION

Despite the increasingly wide and omnipresent digital content, literary texts remain key to the formation of critical thinkers and well-educated individuals. The question arises: how do we incorporate additional literary activities into the busy schedules of today's students? The Goncourt Bulgaria project offers an innovative approach to fostering interest in literature among students studying a variety of often non-humanities subjects through extracurricular activities. The main aim is to awaken a natural interest in literary theory and history, with participants volunteering to take part in the project. This article examines the benefits of the project, focusing not so much on the improvement of language skills, but mostly on the possibilities for developing an interest in literary studies.

2. THE GONCOURT CHOICE OF BULGARIA PROJECT

2.1 History

The Goncourt Bulgaria project is an initiative that draws inspiration from the prestigious French literary prize Prix Goncourt. The prize has a long tradition and significance in France, and its impact is being extended to the international scene through the International Goncourt Choice, which is aimed at students abroad. The main idea of the project is to provide participants with the opportunity to become acquainted with current French literary works that have been nominated for the Prix Goncourt. They read, analyse and discuss these works and finally choose their favourite, which they present in discussion with the other teams in a literary jury format.

2.2 Project features and milestones

The Goncourt Bulgaria project is structured in several phases. Initially, students are introduced to excerpts from the four selected works from the most recent Académie Goncourt`s last selection and are invited to create a sequel to one of them within 800-1000 words. The reading and discussion stage of the novels follows, with participants exchanging views, creating assessment criteria and arguing their points. These discussions are led by the teacher responsible for the team. The exchanges are an important component of the project, as they not only develop students' critical thinking but also lay the groundwork for introducing concepts from literary theory. The final stage involves selecting a winner that represents the preferences of the participants in each team. This selection process is the culmination of months of reading, discussion, and analysis. It is important to note that this selection is not simply an exercise in literary taste, but also involves a serious examination of the artistic merits of the texts, their themes and messages, which requires the use of basic concepts from literary studies.

2.3 Challenges for participants and teachers

Although the project brings many benefits, it also has its challenges. One of them is related to the fact that students are pursuing different majors, have diverse interests, and are not always engaged with literature. Another potential problem is related to time and student workload. Despite their willingness to participate, it is often difficult to find the time for in-depth reading and analysis of the texts, especially when this is not part of their core curriculum. There is also a challenge related to the language barrier. Although students are learning French, their level of proficiency varies, which can make it difficult to understand complex literary texts. This requires teachers to be particularly attentive and to provide extra support when needed. One of the biggest challenges for them is how to motivate students to actively participate and deepen their interest in literature.

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2.4 Benefits of participation in the project and its effects on the development of literary interest

The benefits of participating in the Goncourt Bulgaria project are significant and indisputable. In addition to language proficiency, the project fosters essential abilities like critical thinking, analytical reasoning, and teamwork. One of the most interesting caracteristics of the project is its potential to awaken interest in literature and literary studies among students who may not have been actively engaged with these topics before. The process of writing, reading, discussing, and analysing texts creates a natural environment for fostering an interest in literature and deepening understanding of literary theory and criticism. The innovative pedagogical approach applied in the project consists of students first working with and interpreting the text, and then learning about literary theory and history as they become interested in doing so. This method, which reverses the traditional sequence of previously taught information, increases students' motivation and encourages them to cultivate their own curiosity about this knowledge. When they receive the information after being convinced of its usefulness for specific tasks, they show more interest and confidence in its value. In this way, literary studies become an enriching element in the perception and understanding of the text, not just a set of facts to memorise.

3. CONCLUSION

Reading and discussing literature should be a joyful experience, yet many educational systems, including Bulgaria's, often stifle this natural curiosity. Even students not specializing in literature can reconnect with the wonder that comes from engaging with literary works. It is essential to view knowledge as an opportunity for discovery. Projects like Goncourt Bulgaria provide ideal platforms for fostering autonomous learning by moving away from rote memorization toward engaging, competitive tasks. Such initiatives are vital for encouraging engagement with literary studies, including core concepts and key figures in the field, but they also offer numerous other benefits, such as the development of linguistic, communicative, and personal competencies.

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The Design Thinking Method used in Transport industry disciplines teaching

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Keywords: Design Thinking, Innovative Teaching Methods, Transport Specialty

EXTENDED ABSTRACT

The article presents a study of the application of Design Thinking (DTh) methodology in the disciplines teaching students of Transport Specialties. The implementation of the DTh methodology in the educational process contributes to the improvement of education effectiveness, the development of critical thinking, and practical skills, and the improvement of the general preparedness of students for future professional activities. The article also examines the specific features of thedisciplines related to transportation and analyses the results of integrating DTh in the educational process.

INTRODUCTION

1.1 General information

Today's youth require new highly developed approaches to receiving and processing information. Innovative technologies in a higher educational institution are characterized as technologies based on organizational and methodical innovations. In connection with the changes in the educational process of Ukraine, there is a need to introduce the latest approaches to education, among which DTh occupies a special place.

The transport industry in Ukraine is also in a state of transformation. As a result, specialists capable of flexible changes and quick response, finding effective and creative solutions in a short period, practical skills for effective management of transport flows, and organisation of safe and optimal transportation are needed.

Therefore, the use of the innovative DTh method in the educational process allows for solving complex problems, considering various aspects of transport activity and the interests of all involved parties; to see alternative options and making innovative decisions in difficult situations [1-2].

The works of scientists are quite often connected with examples of successful application of DTh in practice [3-5], which will allow specialists to successfully work with real challenges in the field of transport. The scientists' conclusions are based on the analysis of the results of using the DTh methodology in the educational process [6].

Kelley and Kelley predict that the methodology of introducing innovative approaches will become key in the formation of new generations of specialists able to adapt to the changing conditions of the modern transport environment [7].

1.2 Goal

The purpose of the study is to develop the DTh methodology for transport specialities and to evaluate the effectiveness of the introduction of DTh into the educational process for the "Organization of Transportation and Management of Road and Railway Transport" specialities. It investigates how the use of this approach can contribute to the development of key professional competencies of students, increase their motivation to study and improve preparation for solving real problems in the field of transport logistics.

The results can be used to implement the Th methodology for other engineering specialities.

1.3 Tasks

To achieve the set goal, the following tasks were formulated:

1. Analyses the DTh concept and its application in the educational process of transportation specialities.
2. Identify the characteristics of disciplines related to transportation organisation and management in automobile and railway transport, considering the requirements for using innovative methods in the training of specialists.
3. Develop a methodology for implementing DTh in teaching transportation disciplines.
4. Conduct an experimental study on the effectiveness of DTh in the educational process and analyse the results obtained.
5. Prepare recommendations for further implementing DTh in the educational process of transportation specialities.

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1.4 Scientific Novelty

The novelty of the research lies in the application of the DTh concept to the training of specialists in the field of transportation organization, which has not previously been the subject of systematic scientific research. This article proposes a new approach to teaching transportation disciplines, focused on actively engaging students in the learning process and providing them with opportunities to independently solve complex tasks that simulate real-world professional conditions.

METHODOLOGY

The research was conducted using methods of qualitative and quantitative analysis, which provided a comprehensive understanding of the impact of DTh on the educational process. The primary approach involved the experimental implementation of new learning modules based on the principles of DTh into the curricula for specialities related to transportation organization and management in both automobile and railway transport.
However, the traditional approach to teaching transportation disciplines involves students completing practical tasks according to guidelines developed by instructors, which helps develop learning skills such as memorization, and step-by-step task execution, and includes elements of self-reflection, empathy, and observation. Nevertheless, traditional teaching methods do not allow for an in-depth analysis of real-world problems or the identification of effective solutions.
Considering the specifics of teaching transportation disciplines, it is necessary to develop a methodology for integrating DTh into the educational process of the transportation sector to enable the resolution of complex transportation and logistics tasks while focusing on the needs of real users.

RESULTS AND CONCLUSIONS

The research hypotheses include the following assumptions:
Outdated teaching methods for specialized disciplines lead to modern students losing interest in absorbing information and, consequently, in learning. The use of DTh will improve students' academic performance through a practical approach to problem-solving.
Teamwork is either not practised, or not all students can work in teams due to their psycho-physiological characteristics, which hinders the use of DTh in education.
There is a need to develop a methodology for using DTh in online education for students of transportation specialities.
The absence of evaluation criteria for team or individual work when applying DTh in specialized transportation disciplines for students.
Studies conducted on two groups of students—one taught using DTh and the other using traditional methods—allowed for the following conclusions.
Students who can think critically show good results even with classical methods, but their performance is even better when the DTh methodology is applied.
Therefore, it is necessary to introduce DTh-related disciplines into the curriculum.

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A classical dance-based learning model for Law: an artistic integration as a pedagogical innovation in Legal Sciences

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Keywords: Procedural Law, Art, Gamification, Educational Innovation.

EXTENDED ABSTRACT

1. INTRODUCTION

This work suggests a dynamic connection between physical movement and legal thought, which can capture the attention of law students, particularly in procedural law subjects. The objective is to awaken their interest in this field traditionally noticed austere and boring, demonstrating that, with innovative approaches, learning is improved in an active way. One way for university teaching of Law can be to relate it to the Art. Classical dance is a type of Art whose features can be appreciate as stranger as the ins and outs of the procedure. My proposal is a method based on gamification and *storytelling* that invites to explore how dance, with its precision and discipline, can influence the training of future lawyers whose profession also requires these two elements. The core idea is using, as a didactic resource for teaching the process in law, classical dance where reality is understood through the movement of the body, the music, the expression and codification of its steps, the interaction with audience during a representation, its cultural contribution and the entertainment.

2. METHODOLOGY

The methodology followed for this work is based on the application of active learning techniques, Gamification and Storytelling, for the design of the learning model. This design combines two pedagogical strategies that will allow us to create more dynamic and motivating educational experiences in Procedural Law. On the one hand, gamification involves elements and techniques of games in non-playful contexts, such as Law, where the activities of dance are in themselves a challenge and an incentive for the participation and commitment of students, taking advantage of the intrinsic motivation generated by dance, as if it were a game, to encourage active learning. On the other hand, given that the artistic works that are represented in dance contain the narration of stories, dramas or comedies, I took the storytelling technique for the design of my model, which complements and contextualizes the educational content of Law, applied to the specific case being tried, providing the formal aspects of the process with the factual foundations of any legal controversy. This helps to capture students' attention and make learning more meaningful.

To address the research work, this design is proposed in two phases:

The first phase would be a general one of approaching the subject. It would be about making people understand that just as for classical dance it is necessary to have appropriate clothing, specific and regulated movements linked in a logical and coherent way, with possible variations, to tell the story by dancing and reach the public, to understand the process and be able to act in it, one must also know and respect certain principles, pre-established procedures, which may also be subject to alterations, specific vocabulary, a code of dress and conduct and a way of acting to reach the solution of the case.

The second phase would be more concrete, delving into the development of a process through a case that, instead of being the result of a laboratory, would come from a dance exercise. Through the specific history of one or several well-known dance pieces, the possible criminal types that occur in the plot could be analyzed, determining the jurisdiction and the type of procedure to follow in that case, the role of the procedural subjects, the phases of the procedure and the actions of the parties in it.

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3. RESULTS AND CONCLUSIONS

The primary result of this research is obtaining a learning model for teaching Law, taking advantage of the perceived motivation and structure of dance as an artistic science that serves as a vehicle to achieve the curricular goal of the Procedure Law subject. As a secondary result, the implementation of this model in a specific area of Procedural Law and in a specific classical dance work is proposed.

Innovation for educational purposes allows us to address complex data, contextualize knowledge and expose potential conflicts in a non-traditional way, promoting greater interest in academic issues, in this case, legal ones. The use of techniques such as gamification and storytelling allow us to resort to an emotional component by appealing to empathy to capture the attention of students, to facilitate the approach and understanding of concepts, which represents an additional benefit in the learning process.

Emotions play a crucial role in how we remember experiences, in being aware of how our actions and words in the construction of knowledge create the necessary scaffolding to have good lawyers, great legal professionals and better people, inspired and motivated not only by what they learned, but by how they felt about that learning.

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Implementation of the Type-Variety Principle in Modern Teaching and Learning Methods and Realization of Scientific Research

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Keywords: diversity, type-variety principle, innovation

1. INTRODUCTION

The aim of the article is to study the issues associated with the concepts of diversity and type variety, as well as the development of these concepts for the formation of innovative solutions in various spheres of human activity, e.g. education and science, technicaland economic spheres, social policy, military, agriculture, beekeeping, etc. In modern society, the concepts of diversity and type variety are becoming increasingly important in various areas, and their relevance is exponentially growing every year. Diversity is a combination of multifunctional intelligent solutions and productsof all spheres of human life, uniqueness and development of ideas to improve the society and processes, with respect to the tolerance of society to multicultural diversity and multicultural interaction. Diversity plays a crucial role in increasing labor productivity, reliability, sustainability and fault tolerance of critical infrastructure that leads to the improvement of products and processes. Moreover, diversity contributes to unique perspectives that stimulate innovation and social progress, introducing new ideas that contribute to positive change. Scientifically, diversity refers to the state or quality of being different and distinct, as defined in various disciplines such as biology, philosophy, and ecology. In cybernetics, W. R. Ashby was one of the first scientists to introduce diversity, while defining it in terms of the number of distinguishable elements in a system and their logarithmic relationships [1]. Despite its wide application, diversity remains a multifaceted concept that requires deeper study and understanding of its mechanisms.

2. METODOLOGY

Historically, diversity studies started in the space industry needing reliable systems [2; 3], and were applied to minimize the risk of failure in such areas as non- destructive testing [4], fraud detection [5], and water quality management. Thus, the type-diversity principle was formulated as one of the principles of system analysis which can generally be used in solving different problems and can be formulated as follows [6]: **the type-variety principle** is the purposeful application of components (e.g., systems, elements, technologies, raw materials, models, algorithms, etc.) of different nature (the principle of operation/construction) which perform the same functions but can be used separately: their simultaneous combination and interaction eliminates the recurrence of common failures, as well as provides a qualitatively better solution of the problem of highly reliable long-term functioning of systems (e.g., exception of a possible repetition of general failures, defect detection, analysis of the projects, development of innovative products, business processes, etc.).

The systemic approach, operations research methods, and the method of sequential analysis of alternatives form the methodological foundation of this study and are applied when implementing the type-variety principle [2-6]. Mechanisms of the type-variety principle involve the formation of multiple combinations of diverse sub-options which, through the use of sequential analysis procedures, generate potential solutions for two-level mathematical models in discrete optimization problems. The developed solution algorithm and procedures for eliminating non-promising options in the process of forming diverse optimal solutions are presented in [2-3].

The mechanisms of the type-variety principle are applied to develop innovative and efficient solutions to challenges across various fields of scientific research [7] and education [8-9] that demonstrates the connections between diversity, type variety and innovation and their application in teaching and learning methods, as well as the development of hierarchically interconnected educational programs and targeted scientific research to address relevant challenges. The relationships between diversity and innovation have been the subject of extensive research over the years. One of the main challenges

faced by present-day Ukraine is the energy supply to its territories. A promising approach to address this issue is the formation of a type-variety energy portfolio by the generation companies in different regions of Ukraine, based on the experience of European countries [10]. An important example of application of the type-variety principle is its use in the interdisciplinary areas of medicine that focus on the creation of various type-variety exercises for the rehabilitation of patients undergoing treatment of specific physical and psychological traumas by utilizing physical exercises derived from diverse medical practices [11]. This principle underscores the importance of universities in fulfilling their Third Mission which ensures a connection between education, science, and their societal roles.

3. RESULTS AND CONCLUSIONS

The goal of this research is to demonstrate, through system analysis and the concepts of diversity and type variety, the emergence and nature of the type-variety principle as an outcome of scientific exploration across various critical applied fields. These fields involve the development of new mathematical models, methods, and algorithms, while highlighting the principle's innovative aspects and its application to solving urgent scientific, technical, and social problems. Based on this principle, the authors proposed a specific methodology to be used in education and research. This methodology has evolved into a systematic practice, enabling rapid responses to urgent challenges in education and science which are continuously evolving in today's fast-changing world. In particular, the proposed type-variety principle and associated ideology could facilitate the introduction of modern, innovative teaching and learning methods into the educational process in Ukraine and the European Higher Education Area (EHEA) in general. In 2024, there is a renewed emphasis on cutting-edge forms of teaching, learning, and assessment in the interactive world that aim at guiding educators and policymakers toward productive innovations rooted in diversity and type variety. In the nearest future, we expect to observe the application of the proposed **type-variety principle** and ideology to achieve an ambitious global goal, i.e. to establish transnational joint educational provisions on the European and global scale.

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Simulation in Disability Studies: A Didactic Proposal

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Keywords: Disability Simulations, Accommodation, Experientialism

EXTENDED ABSTRACT

1. INTRODUCTION

In this paper I define and discuss a type of learning activity for Disability Studies where the student is invited to experiment aspects of disability in the flesh. Disability simulation activities consist of punctual participation in specific social environments as a disabled person, or in ways which allow to experience disability and reflect about it. Disability simulations can be understood as an experientialist didactic strategy. Contemporary 'experientialism' in education broadly refers to views and practices which involve (1) getting out of the classroom and (2) learning through engaging in activity; sometimes they mesh together these two elements in a diffuse way [1].

Seaman et al. [2] locate the inaugural practice of experiential learning in the action research developed by Kurt Lewin, Ronald Lippitt and other applied social psychologists, where they collaborated with practitioners in trainings involving the self-evaluation and discussion of small group processes [3]. Ozar [4] provided an operational definition of 'experientialism' as encompassing learning designs that introduce a moment or phase of 'reflection' connected to some practical activity in real life. This notion coheres with David Kolb's model, which defines experiential learning as "the process whereby knowledge is created through the transformation of experience" [5].

Kolb proposes that a learning process occurs in a four-step cycle: Concrete experience leads to reflective observation; observation leads to abstract conceptualization, which leads to active experimentation in new situations; experimentation then leads the learner to another concrete experience (looping back to a next iteration). The reliance of this model on Piaget's genetic epistemology is explicit. The model itself can generally be seen as a theoretical contribution to psychological constructivism.

Disability simulation activities consist of learning activities designed to make non-disabled learners experience select aspects of having a disability. They incorporate, by definition, a problematic feature: You simulate being somebody you are not and experiencing something you do not habitually experience. In that sense, disability simulations are partially limited: they can never capture the experiences of impairment and ableism with their genuine essential properties.

Disability simulation activities can provide the student with opportunities to understand and describe the barriers encountered by people with disabilities; to think about how the environment can be changed; to experience the attitudes addressed at them by others during the activity. Ultimately, simulations should change the students' attitudes towards disability and disabled people, increase feelings of empathy and improve the understanding of the first-person disability experience. These motives and purposes align with experientialist pedagogy and fit well with the sequence proposed in Kolb's [5] model: The student can reflect about the observations made during the experience, focusing on environmental barriers and on the responses perceived from other people. These reflections are meant to modify attitudes and feelings, as a process of consolidation of learning that involves both cognitive and emotional change.

The most typical disability simulation consists of moving around in a wheelchair. The second most popular one involves doing activities or moving around blindfolded. In my teaching of courses on Disability I have developed other variations of simulations, to give students the chance to reflect on aspects of communicative and cognitive impairment. These simulations require the student to think or behave in a different way, associated to some characteristic impairments. For example, we can instruct the student to delay every move or action for a few seconds, forcing them to behave and experience activities with slowness and delay; or we can require them to remain silent through social situations.

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2. STUDENT REPORTS ON DISABILITY SIMULATIONS

The empirical contribution of this paper consists of an analysis of a sample of student reports from four Disability simulation designs: (1) moving around in a wheelchair; (2) doing activities or moving around with a blindfold; (3) delaying every action or move for a few seconds; (4) and remaining in silence for a period of time. I analyzed 17 reports from each of the four designs (a total of 68 reports), using the qualitative research software MaxQDA©. For all of them, I codified and analyzed all text referring to three topics relevant to reflection and learning from simulation. These three elements are key to the process of reflecting from direct experience and to the analysis of disability in context:

- Text describing or discussing **accommodations** during the simulation.
- Text describing or discussing the **reactions of other persons** (not students doing the simulation) during the simulation.
- Text summing up what the **student has learnt** from the experience.

3. FINAL REFLECTIONS AND WAYS FORWARD

From my general experience developing disability simulations and the brief analysis of a sample of student reports from these activities, I would highlight the following conclusions and suggestions for future development:

- Disability simulations effectively contribute to experientialist learning by providing opportunities for awareness, reflection and feeling about a specific practice in context, and for learning from that cognitive and emotional experience. They work in ways similar to the interventions by Lippit and others [3] where the examination of the learner's own activity becomes the object of sociological analysis. On top of that, disability simulations provide opportunities to reflect about psychological processes related to the organization of functional activity and the articulation of human competence in context.

- Reporting in written form is fundamental to disability simulations and other experientialist activities, as it requires articulating thought in the conventional language of the discipline and speaking to an audience in a process that allows for the revision and gradual improvement of a text.

- We should care to prevent the risk of orienting disability simulations to the 'exotification' or mystification of disability. Much of the text analyzed in the former section tends toward this attitude, which is contrary to the social model perspective. The purpose of activity and reflection should be to understand functionality and social interaction in context, rather than magnifying or admiring the properties or human values associated to impairment.

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Aplicación de la Inteligencia Artificial para la Clasificación de Currículums Académicos basados en los Principios de DORA

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Palabras clave: Inteligencia Artificial, Gestión Universitaria, Clasificación de Currículums, Principios DORA.

RESUMEN EXTENDIDO

1. INTRODUCCIÓN

En la gestión universitaria, la evaluación de currículums académicos es una tarea clave para la contratación, promoción y reconocimiento de investigadores. Tradicionalmente, la clasificación de currículums se ha basado en métricas cuantitativas, como el número de publicaciones o el índice de impacto de las revistas. Sin embargo, estas métricas no siempre reflejan de manera justa el valor real de la contribución científica o académica de una persona. En este contexto, el uso de la inteligencia artificial (IA) ofrece una oportunidad para mejorar este proceso, alineándose con los principios del DORA (Declaration on Research Assessment), que promueve una evaluación más cualitativa y justa del impacto académico [1][2]. Este trabajo tiene como objetivo explorar cómo la IA puede ser utilizada para clasificar currículums académicos de manera más eficiente y justa, integrando criterios cualitativos que consideren la diversidad de contribuciones académicas, como el liderazgo en proyectos, el impacto social de la investigación, la colaboración interdisciplinaria y la creación de recursos educativos. Las hipótesis clave de este estudio son: (1) La IA puede proporcionar una evaluación más equitativa de los currículums académicos al utilizar múltiples fuentes de datos y criterios de evaluación más amplios; (2) Los principios de DORA, cuando son implementados correctamente en algoritmos de IA, permiten una clasificación de currículums más alineada con el impacto real de los académicos en su campo.

2. METHODOLOGÍA

El enfoque metodológico de este proyecto sigue una estructura en varias fases, utilizando tanto técnicas de procesamiento del lenguaje natural (NLP) como algoritmos de clasificación supervisada [3][4].

1. Recolección de Datos: El primer paso es obtener un conjunto de currículums académicos que incluyen no solo publicaciones, sino también descripciones de proyectos, participación en conferencias, mentorías, docencia, y colaboraciones internacionales.
2. Preprocesamiento y Análisis mediante NLP: Se emplea NLP para analizar los currículums, extrayendo información relevante como las contribuciones académicas (publicaciones, proyectos, enseñanza) y el impacto social o práctico de las investigaciones. Esto permite que el algoritmo de IA pueda evaluar aspectos cualitativos más allá de métricas tradicionales.
3. Clasificación Supervisada: Se entrenará un modelo de clasificación (por ejemplo, Random Forest o Support Vector Machines) utilizando un conjunto de currículums etiquetados previamente según su alineación con los principios de DORA. Los principios de DORA promueven evaluar la calidad de la investigación y el impacto académico de manera más holística, tomando en cuenta no solo el número de publicaciones, sino también factores como el liderazgo en proyectos, la innovación, el impacto social, y la participación en actividades educativas y colaborativas.
4. Evaluación de Impacto y Contribuciones Diversas: A diferencia de los métodos tradicionales que se centran en métricas como el índice de impacto o las citas, el modelo de IA desarrollará criterios de clasificación que consideren la diversidad de contribuciones académicas. Estas incluyen:
    - Publicaciones académicas: Evaluadas no solo por su número, sino también por la relevancia y el contexto de la investigación.
    - Impacto social: Contribuciones que hayan impactado en la industria, políticas públicas o la sociedad en general.
    - Colaboración y liderazgo: Participación en proyectos interdisciplinarios y liderazgo en equipos de investigación.
    - Contribuciones educativas: Creación de materiales educativos, participación en mentorías, y el desarrollo de programas académicos.

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5. Validación y Mejora: El modelo se validará mediante pruebas cruzadas y ajustes continuos, garantizando que la clasificación final sea justa y objetiva, alineada con los principios del DORA.

3. RESULTADOS ESPERADOS

Aunque aún no se tienen resultados concretos, se espera que la aplicación de IA en la clasificación de currículums proporcione una serie de beneficios clave:

1. Evaluación más justa y contextualizada: La IA permitirá realizar una evaluación más equitativa de los currículums académicos, considerando no solo las métricas tradicionales, sino también contribuciones que reflejan un impacto más amplio en la academia y la sociedad. Los resultados mostrarán que los currículums que incluyan liderazgo en proyectos, impacto social o colaboración interdisciplinaria serán valorados de manera más adecuada en comparación con aquellos que se centran exclusivamente en el número de publicaciones[5].
2. Reducción de sesgos: Al emplear IA y basarse en los principios de DORA, se espera reducir los sesgos asociados con la evaluación puramente cuantitativa. El sistema clasificará los currículums según la calidad y el impacto global de las contribuciones, mitigando la dependencia de índices de impacto como criterio exclusivo.
3. Mejora en la toma de decisiones: La IA facilitará la gestión universitaria al permitir un análisis más rápido y eficiente de grandes volúmenes de currículums. Esto agilizará los procesos de selección y promoción académica, permitiendo a las instituciones centrarse en candidatos que realmente aporten valor a la universidad y la sociedad.
4. Alineación con principios de equidad académica: La implementación de los principios de DORA a través de IA permitirá una mayor alineación con los valores de equidad y diversidad en la evaluación académica. Esto ayudará a las instituciones a reconocer no solo la excelencia científica, sino también el compromiso con la educación, la mentoría, y la innovación.

4. CONCLUSIONSES ESPERADAS

La investigación anticipa que la IA puede transformar la manera en que las universidades gestionan los currículums académicos, proporcionando una evaluación más justa, inclusiva y alineada con los principios de DORA. A medida que los sistemas de IA maduran, será posible personalizar aún más los algoritmos para adaptarlos a las necesidades específicas de cada institución, promoviendo una cultura de evaluación que valore la diversidad y el impacto real de las contribuciones académicas.

Se espera que los resultados de este estudio también sirvan como base para futuras investigaciones sobre cómo la IA puede apoyar otras áreas de la gestión universitaria, facilitando la toma de decisiones y reduciendo la carga administrativa sin comprometer la calidad de los procesos.

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El uso de ChatGPT en la resolución de casos de estudios en la educación superior: Aspectos positivos y negativos según la percepción de los estudiantes

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Palabras clave: ChatGPT, estudio de casos, educación superior, inteligencia artificial.

EXTENDED ABSTRACT

1. INTRODUCCIÓN

En los últimos años, el uso de las Tecnologías de la Información y Comunicación (TIC) en la enseñanza universitaria ha posibilitado la democratización del acceso a los recursos educativos disponibles en internet donde los estudiantes pueden disponer de información y materiales didácticos en cualquier momento y lugar (García Sánchez, 2023). El surgimiento de la inteligencia artificial (IA) y su incorporación al proceso de enseñanza aprendizaje, se ha convertido en un fenómeno digno de estudiar al ser una herramienta transformadora de la educación superior, con un impacto significativo en la enseñanza, el aprendizaje y los procesos administrativos. Además, los sistemas avanzados de retroalimentación instantánea ofrecen a los alumnos una evaluación más rápida y precisa de su desempeño, mejorando su experiencia de aprendizaje. Estos avances no solo optimizan los procesos educativos, sino que también potencian la participación de los estudiantes en un entorno más dinámico y personalizado (García Sánchez, 2023).

La IA ha ido cobrando un protagonismo creciente en nuestras vidas, tal y como señala García-Peñalvo (2023: 1) "[…] el fenómeno ChatGPT ha vuelto a poner en primera plana esta disciplina, así como sus efectos, tanto positivos como negativos en la sociedad", lo que está generado un debate especialmente intenso en el mundo de la educación y la investigación científica. Aunque en este debate nos podemos encontrar con detractores que apuestan por su prohibición por temor a que el estudiantado lo utilice para generar automáticamente sus trabajos, nos alineamos con los planteamientos que defienden que quizás el problema no está en la herramienta en sí, sino en un cambio de paradigma educativo en el que no debemos ignorar que este tipo de herramientas ya existe y han venido para quedarse.

A pesar de la creciente preocupación por el uso de ChatGPT, sigue siendo interesante realizar estudios que exploren las experiencias de los estudiantes con ChatGPT en un entorno educativo, principalmente en el ámbito universitario (Ngo, 2023). Aún existe un vacío sobre la comprensión de los factores determinantes de la satisfacción de los estudiantes y su uso (Crompton y Burke, 2023). Comprender la satisfacción de los estudiantes es fundamental para mejorar el diseño y la implementación de herramientas de aprendizaje impulsadas por IA (Yassin y Bashir, 2024). Por lo tanto, este artículo pretende contribuir a esta línea de investigación analizando la percepción de los estudiantes universitarios sobre el uso de ChatGPT en la resolución de casos prácticos. Para ello se realizó una encuesta a 228 estudiantes que participaron en una actividad práctica en el aula consistente en la resolución de un caso de estudio utilizando ChatGPT como herramienta de consulta. Tras un análisis cualitativo y cuantitativo de los datos obtenidos se ha podido identificar los aspectos positivos y negativos percibidos por los estudiantes sobre el uso de esta herramienta de IA como apoyo a la enseñanza presencial, así como su grado de satisfacción e intención de uso, analizando las posibles diferencias en función del género, la edad y la experiencia laboral de los participantes.

2. METODOLOGÍA

Los datos necesarios para este trabajo se recopilaron a través de una encuesta dirigida a los estudiantes de las asignaturas Habilidades Directivas del Grado en Turismo y Comportamiento Organizativo y Dirección de Empresas del Grado en Administración y Dirección de Empresas de la Universidad de Las Palmas de Gran Canaria (ULPGC) en el curso académico 2023-2024. Los estudiantes completaron la encuesta mediante un cuestionario en Google Forms, disponible en el campus virtual de la asignatura, bajo la supervisión de los profesores en la sesión práctica en la que se realizó la intervención en el aula consistente en la resolución del caso titulado "Liderazgo Directivo y Participativo". El objetivo de

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dicha actividad consistía en la resolución de este caso de discusión, utilizando ChatGPT, y obtener evidencias de la opinión del estudiantado sobre la incorporación de esta herramienta de IA en su proceso de enseñanza-aprendizaje. La muestra final está compuesta por 228 estudiantes de una población total de 278, lo que da como resultado una tasa de respuesta del 82%. Además, con un nivel de confianza del 95% y un margen de error del 4,14%, la muestra se considera representativa de la población total.

En este estudio hemos optado por utilizar una metodología mixta en la que intentamos responder a la pregunta de cuáles son los aspectos positivos y negativos derivados del uso de ChatGPT por los estudiantes universitarios mediante el uso de cuestionarios con preguntas cerradas y abiertas. Para la realización del estudio se utilizaron diferentes variables que fueron medidas con escalas Likert de 5 puntos provenientes de estudios previos. Los datos fueron codificados y tabulados, para posteriormente ser analizados con el programa estadístico SPSS, versión 28.0 de Windows, empleando diferentes técnicas estadísticas (e.g., estadísticos descriptivos, pruebas no paramétricas de diferencias de medias, análisis factorial, correlaciones). Para conocer la percepción de los estudiantes sobre el uso de ChatGPT en la resolución de casos, se consideró conveniente incluir en el cuestionario dos preguntas abiertas. En este trabajo se optó por utilizar la IA para sintetizar las respuestas de los estudiantes a las preguntas abiertas sobre los aspectos positivos y negativos de utilizar ChatGPT en la resolución de un caso práctico.

3. RESULTADOS Y CONCLUSIONES

Con este estudio se ha podido analizar la percepción de 228 estudiantes de educación superior sobre el uso de ChatGPT en la resolución de casos prácticos en dos asignaturas de Organización de Empresas tras la realización de una intervención en el aula. Los resultados alcanzados tras aplicar un diseño metodológico mixto combinando un estudio cualitativo con otro cuantitativo revelan que existe un alto nivel de satisfacción con el uso de esta herramienta de IA en la dinámica de resolución de casos llevada a cabo, estando los chicos más satisfechos que las chicas con el uso de esta herramienta de IA. Además, los estudiantes manifiestan una alta intención de uso de ChatGPT en el futuro, sobre todos los chicos. Tanto para la satisfacción como para la intención de uso no existen diferencias estadísticamente significativas en función de la edad o de la experiencia profesional de los estudiantes.

Por otro lado, se ha llevado a cabo un análisis de correlación entre las variables objeto de estudio. Los resultados revelan la existencia de una correlación positiva y significativa entre la satisfacción con el uso de ChatGPT y su intención de uso futuro ($r= 0,463$, $p<0,001$). Así mismo, se observa que el género de los estudiantes también está correlacionado de manera positiva y significativa con ambas variables ($r= 0,143$; $p<0,05$ con satisfacción y $r= 0,173$ $p<0,01$ con intención de uso).

En cuanto a los resultados obtenidos en el estudio cualitativo se evidencia que los estudiantes son plenamente conscientes de los aspectos positivos y negativos asociados al uso de ChatGPT en su proceso de enseñanza-aprendizaje. Como aspectos positivos, los estudiantes valoran el ahorro de tiempo en la obtención y síntesis de grandes volúmenes de información, a través de una herramienta fácil de usar y accesible en cualquier momento y lugar, que les permite obtener explicaciones detalladas sobre temas complejos y ser más productivos al concentrar sus esfuerzos en el análisis de la información. Con respecto a los aspectos negativos, se menciona la posible pérdida de habilidades cognitivas que disminuyen el pensamiento crítico, la creatividad y la capacidad de resolución de problemas. Además de los problemas de veracidad y fiabilidad de la información proporcionada por la herramienta cuando no se formulan y contextualizan bien las preguntas, los estudiantes son conscientes de los problemas que puede tener el abuso del “corta y pega”.

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¿La Inteligencia Artificial puede mejorar las habilidades para educar en Neurociencia del Dolor?

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Palabras clave: Dolor; Inteligencia Artificial; Educación; Fisioterapia

RESUMEN EXTENDIDO

1. INTRODUCCIÓN

El dolor crónico es un problema de salud pública global, afectando a un sexto de la población en España y un quinto en Europa [1,2]. Este tipo de dolor no solo disminuye la calidad de vida, sino que también genera importantes repercusiones psicológicas y emocionales, como depresión, catastrofización y conductas de evitación [3]. La neurociencia del dolor, entendida como la enseñanza del funcionamiento de los sistemas nerviosos involucrados en la percepción y procesamiento del dolor, se ha postulado como una herramienta fundamental para transformar la experiencia dolorosa [4]. Sin embargo, a pesar de la relevancia de esta disciplina, la formación académica en dolor crónico en los grados de Ciencias de la Salud es insuficiente [5].

El uso de la inteligencia artificial (IA) en la educación ha demostrado un potencial considerable para optimizar los procesos de aprendizaje, facilitando la personalización y el acceso a recursos educativos [6,7]. En este proyecto se ha evaluado el uso de un chatbot basado en IA, Poe, para la enseñanza de la neurociencia del dolor en estudiantes de fisioterapia, con el objetivo de mejorar su formación teórica y práctica mediante una metodología colaborativa apoyada en herramientas digitales.

2. METODOLOGÍA

Este estudio se llevó a cabo con 42 estudiantes del segundo curso del Grado en Fisioterapia de la Facultad de Ciencias de la Salud, durante el curso 2023-2024. La intervención consistió en una propuesta educativa donde los estudiantes debían desarrollar charlas divulgativas sobre la neurociencia del dolor, orientadas tanto a sus compañeros como a pacientes ficticios. Los contenidos abordados incluían la fisiopatología del dolor crónico y las estrategias para su manejo desde una perspectiva interdisciplinar.

Como herramienta complementaria, se utilizó el chatbot Poe, configurado específicamente para proporcionar información detallada sobre neurociencia del dolor. Poe permitió a los estudiantes acceder a respuestas inmediatas y fundamentadas, promoviendo un aprendizaje autónomo y personalizado. Para evaluar la efectividad de la intervención, se utilizó un cuestionario basado en el *Neurophysiology of Pain Questionnaire*, administrado antes y después del programa formativo. Además, se recogieron datos cualitativos y cuantitativos sobre la experiencia de los estudiantes con el uso del chatbot mediante encuestas de satisfacción y análisis de la propuesta pedagógica.

3. RESULTADOS

El análisis de los resultados mostró una mejora significativa en el nivel de conocimientos de los estudiantes tras la

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intervención, con una diferencia estadísticamente significativa entre las puntuaciones previas y posteriores (p=0.001). La media de las puntuaciones pasó de 6.03 a 7.43, lo que indica una asimilación efectiva de los contenidos sobre neurofisiología del dolor. Además, el 80.6% de los estudiantes reportó no haber recibido formación previa en este ámbito, lo que refuerza la necesidad de incorporar metodologías innovadoras en la educación sobre el dolor.

Respecto al uso de la IA, el 56.1% de los estudiantes calificó al chatbot como fácil de usar, y un 48.8% lo consideró útil para su aprendizaje. Asimismo, un 76.19% se mostró "muy satisfecho" con la experiencia, y el 71.43% recomendaría el uso del chatbot en futuras formaciones. A nivel cualitativo, los estudiantes valoraron positivamente la capacidad del chatbot para ofrecer respuestas precisas y referencias bibliográficas, destacando su utilidad en la profundización de los temas abordados en clase. No obstante, se sugirieron mejoras como la incorporación de recursos visuales y la síntesis de la información proporcionada.

4. CONCLUSIONES

Este proyecto ha demostrado que el uso de la inteligencia artificial, a través de un chatbot entrenado, puede ser una herramienta educativa complementaria eficaz en la enseñanza de la neurociencia del dolor en estudiantes de fisioterapia. La combinación de metodologías colaborativas con tecnologías basadas en IA ha facilitado no solo la adquisición de conocimientos teóricos, sino también su aplicación práctica en contextos simulados. Los resultados reflejan una mejora significativa en la comprensión de los contenidos, además de una alta satisfacción con la herramienta de IA, lo que sugiere que su integración en programas formativos puede mejorar la calidad de la educación en Ciencias de la Salud. Futuros estudios deberían explorar la optimización de estas tecnologías para maximizar su impacto en la formación de profesionales de la salud.

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Comparison of face-to-face and online teaching in engineering degrees: a case of study at U-tad university

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Keywords: Face-to- face leaning, online learning, student's surveys, engineering degrees.

EXTENDED ABSTRACT

1. INTRODUCTION

In recent years, the teaching of engineering degrees has undergone significant changes. These changes are mainly focused on the incorporation of new technologies to support teaching, possibilities of studying the degrees in English as well as the on-line option, which is highly valued by students who combine work and study. The possibility of studying engineering degrees in English has been available at most Spanish universities since 2007 when Spain joined the European Higher Education Area. When Spanish universities joined this new area, they followed the lines of work of European universities and, at present, most institutions offer courses taught in English with the aim of increasing competences in this field, attracting foreign students and teaching staff and obtaining better results in higher education rankings [1], [2]. On the other hand, on-line training in Spanish universities is another booming phenomenon. This growth was very relevant during the Covid-19 pandemic and is currently a growing option in our country, together with the option in English [3].The incorporation of modalities in English and online covers a very interesting area for university students from the point of view that skills are applied, and, on the other hand, they improve access to university studies, especially for those who need to combine work with university education. These teaching models are not new in our country since there are even universities that have been born with the purpose of specializing in this specific training modalities. Universities such as the UNED or the UDIMA are already born as universities for distance/online training [4], [5]. Other universities, especially those based on a private operating model, include the possibility of studying engineering degrees in English as another common option. These new modalities require adaptations in teaching methodologies in order to achieve a similar quality regardless of the mode of study chosen by the student. The aim of this work is to analyze the methodologies applied to B. S. computer science degree courses at the U-tad university center. This university combines the three modalities described in this work, i.e. face-to-face mode in Spanish and English, while offering the same degrees in online mode. In this context, the aim is to describe the methodologies applied in each of the modalities and to analyze the results obtained in the 2023-2024 academic year. In this context, the main purpose of the study is to be able to apply the methodology developed, to incorporate improvements over the next academic years and to measure the effectiveness of the whole process.

2. METHODOLOGY

The methods to be applied are based on statistical analysis using boxes and whiskers for the academic results and grouping of representative categories in the case of the surveys. The study focuses on the degree in Computer Science taught at the U-tad university center for the 2023-2024 academic year, specifically on the subject of computer networks, given that it is a representative case of the teaching given at this center. After describing the three modalities of study available, two face-to-face (Spanish and English) and one online, both academic data and surveys carried out by students are analyzed. After this step, different improvement actions are proposed to improve both the academic results and the levels of satisfaction analyzed. The proposed methodology follows an iterative model, in such a way that, each academic year that is analyzed, the measures applied in the previous year can be validated or new ones can be proposed to continue improving the academic and satisfaction indicators.

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3. RESULTS AND CONCLUSIONS

3.1 Lesson learned

- The online modality is the one that has the best academic performance and is also the most highly valued by students.
- It has better academic performance in the face-to-face mode in Spanish than in English, although students are more satisfied in the English mode.
- Although in the face-to-face mode the final exam carries little weight in the overall grade, there is a high correlation between the final exam grade and the overall grade for the course. This implies that both assessment methods, face-to-face and online, are similar.
- The face-to-face modality uses more traditional methods of evaluation such as practical projects and exams. On the other hand, the online modality incorporates new forms of evaluation such as theoretical tests and discussions, obtaining better academic results and student satisfaction.

3.2 Proposals for improvements

- Given that the online modality obtains better academic results, it is proposed to include in the face-to-face modality debates that are the best academic response obtained.
- The face-to-face modality in English obtains worse academic results than the Spanish modality, if with the previous measure, including discussions, does not improve, technological tests could also be included as an additional option.
- The online modality is the best accepted by students, given that the two measures previously exposed incorporate elements of the online modality to the face-to-face one, it is expected that the surveys will present better results once these measures are incorporated.

After analyzing the three study modalities available at the center, face-to-face in Spanish, face-to-face in English and online, interesting correlations can be found between the methodologies applied and the results obtained. With this knowledge, this work proposes actions for improvement in the different modalities in order to continue improving both academic results and student satisfaction. As a relevant point of this work, apart from proposing the aforementioned actions, a framework is proposed that facilitates the analysis of academic results and student surveys in order to identify possible actions for improvement. On the other hand, it is important to emphasise that the proposed methodology follows an iterative model, so that each academic year that is analyzed can validate the measures applied in the previous year or propose new ones. This is due to the fact that the proposed framework is sensitive to both the sample of students analysed and their profile can vary considerably from one academic year to the next.

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Use of a Digital Driving Twin to Teach Development Skills in the Field of Autonomous Driving

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Keywords: Teaching methodologies, Digital skills, Digital Driving Twin, AI-based Scenarios

1. INTRODUCTION

In today's rapidly evolving technological landscape, traditional teaching methods are insufficient to prepare students for the demands of modern industries, particularly in fields like autonomous driving. The "learning factory" model presents an innovative solution, integrating academic instruction, research, and industry collaboration. By simulating real-world business structures, such as those in the automotive sector, the learning factory provides students with hands-on experience in developing driver assistance systems, digital twins, and autonomous driving functionalities. Through this interdisciplinary approach, students are exposed to practical, project-oriented tasks that mirror the complexities of real industrial challenges, thereby equipping them with essential skills for the modern workforce [1, 2].

The learning factory, exemplified by the Wildauer Maschinen Werke (WMW), aligns academic programs with industrial processes, facilitating specialized training in areas such as mechanical engineering, business informatics, and logistics. One key aspect of this educational model is the use of 1:14 scale vehicles equipped with sensors and actuators, allowing students to develop and test autonomous driving systems in a realistic setting. Additionally, advanced tools for software engineering and AI-supported project management enhance the practical learning experience, fostering collaboration and accountability among students [3].

2. METHODOLOGY

The learning factory model incorporates advanced simulation environments, including CARLA and AirSim, which are critical for the development and testing of autonomous driving functionalities. CARLA provides pre-built digital environments and integrated traffic simulations, while AirSim offers flexibility in custom environment creation, making both platforms suitable for hands-on student projects [4, 5]. These platforms are integrated within the WMW infrastructure, enabling seamless communication between virtual and physical entities, thus supporting real-time testing of autonomous systems.

A significant feature of the learning factory is the implementation of a digital twin, which connects the virtual and real-world environments, allowing for the real-time interaction between simulated vehicles and those on the physical test track [6]. This setup offers students the opportunity to test and validate systems under mixed conditions, where simulation and reality converge. Additionally, AI-driven techniques, including neural networks and Generative Adversarial Networks (GANs), are used to automate the creation of complex simulation scenarios, accelerating both testing and development processes.

3. RESULTS AND CONCLUSIONS

The learning factory has demonstrated significant educational and practical benefits. Students gain hands-on experience in managing the lifecycle of autonomous driving technologies, from conceptual design to operational deployment. By working within a simulated corporate structure, they develop interdisciplinary skills, collaborate across various academic programs, and solve real-world challenges. The use of advanced simulation environments and the digital twin allows students to engage in realistic and risk-free testing of autonomous systems, particularly in safety-critical scenarios such as emergency braking and lane-keeping assistance [6].

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The integration of AI and automation in scenario generation enhances the efficiency of the learning process, allowing students to explore the iterative nature of engineering in a dynamic, practice-oriented setting. Furthermore, the collaboration with industry partners, such as the Volkswagen Group, bridges the gap between academic theory and industrial application, fostering the transfer of research outcomes into real-world solutions [7].

In conclusion, the learning factory model represents a forward-looking approach to higher education, preparing students for the technological challenges of the future. Through its interdisciplinary and technology-supported framework, the learning factory equips students with the skills needed to thrive in digitalized and automated industries. The continued development of technologies like digital twins, augmented reality (AR), and real-time data processing holds great potential for further enhancing the educational experience, making the learning factory a key tool in the advancement of both education and industry.

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The applicability of metaverse in nursing education: exploring head dissection.

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Keywords: Metaverse, Nursing Education, Anatomy, Virtual Reality.

Hands-on dissection and prosection activities enable students to study actual human beings and cultivate an understanding of the variety of anatomical systems. Student can also gain a fundamental grasp of these structures on a topographical level, particularly regarding their positions and connections with other structures. Nursing students typically must convey a lot of information in a short amount of time. Because of this, there are fewer opportunities for students to enter the dissecting room, which limits their ability to build these mechanisms [1]. Metaverse interventions can support increased knowledge, self-confidence, engagement, satisfaction, and performance in nursing students while facilitating real-time collaboration and communication [2]. Through a virtual environment, it is possible to simulate a dissection laboratory where students can perform anatomical dissections by accessing a virtual body. Human patient/bodies avatars undermine an even more realistic and visually appealing teaching tool [3].

1. METODOLOGY

1.1 VR Technological Resources

A VR program was made available to 130 first-year nursing students for use in lab exercises. The program was designed and customized to meet our educational goals. In particular, the following device configuration is required for Immersive Learning Classrooms (AIDA): four VR head-mounted displays (HMD) and four hand-held controllers of any commercially available brand; a desktop or laptop computer with a standard graphics card (such as Intel(R) UHD Graphics 620); an average processor (such as Intel(R) Core(TM) i7-8550U GPU @ 1.80 GHz 1.99 GHz) and 16GB of RAM; and a standard router to establish a local Wi-Fi network to which all devices are connected in a shared wireless network.

1.2 Head Dissection

The option to dissect a human head has been included in the metaverse for the Anatomy course for the Nursing degree. The lesson plan included a plane-by-plane dissection of the skin to identify key anatomical features such the brain, muscles, bones, meninges, nerves, arteries, and veins.

1.3 Evaluation of the experience

Following the experience, students were asked to fill out a questionnaire that was like the one in Rodriguez-Florido et al. (2024) and questioned about several issues related to the metaverse's practical environment [4].

2. RESULTS AND CONCLUSIONS

2.1 Results of the questionnaire

A total of 122 Anatomy Nursing students answered the aforementioned survey. The results of the completed surveys are displayed in this section. Cronbach's alpha was used to assess the questionnaire's validity, and bootstrap was performed to determine the 95% confidence intervals. R was the statistical software that was utilized.

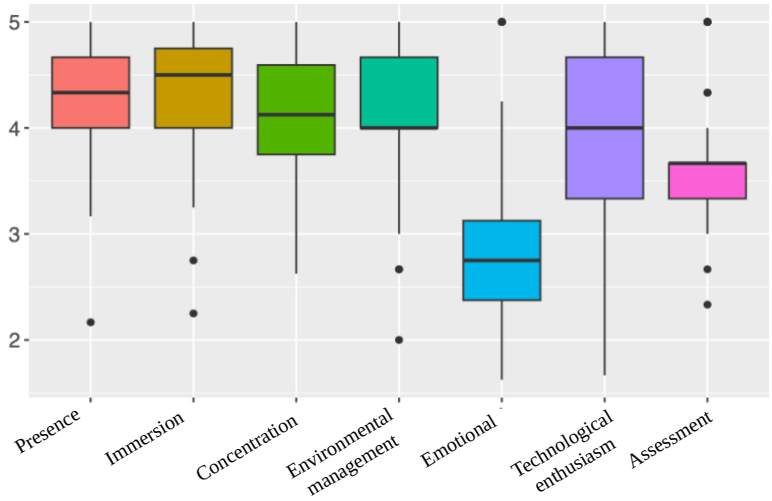

Figure 1. A box plot displaying the average values for each subscale. The score values are coded from 1 to 5, and the lowest score in the "emotional" block, indicating a better assessment.

2.2 Interpretation of the questionnaire

We were able to draw useful scientific conclusions from our study because the questionnaire passed the statistical validity checks for each subscale of questions. In particular, according to Figure 1, the overall assessment of the use of an Immersive Learning Classroom (AIDA) in the dynamics of the practices of Nursing Degree is fairly positive, with the values of each subscale being above 3 on a scale of 1 to 5. In the case of the "emotional" subscale, the evaluation is positive for values near to 1.

2.3 Conclusions, strengths and limitations

The metaverse may be effectively used to teach anatomy nursing students thanks to the technological adaptations. However, the metaverse cannot be implemented without cutting-edge and innovative technologies, which call for specific training and use. Everyday VR execution is challenging and needs continuous technical assistance for consistent use in practice. Nevertheless, the utilization of digital technologies in the classroom offers a change of pace and opportunities for learning that are not achievable in traditional anatomy education.

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Experiencia de aprendizaje servicio a través de *Maker Education*

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Palabras clave: Diseño de experiencias de aprendizaje, *Maker Education*, Aprendizaje-Servicio, Habilidades blandas

RESUMEN EXTENDIDO

1. INTRODUCCIÓN

Este trabajo presenta la experiencia en el desarrollo de un recurso didáctico inclusivo dirigido a niños de educación primaria con discapacidad visual, llevado a cabo como Trabajo de Fin de Grado por una estudiante de la Escuela de Ingenierías Industriales y Civiles (EIIC) de la Universidad de Las Palmas de Gran Canaria. Se ha desarrollado en el Taller de Ingeniería en Diseño Industrial, Las Cocinas [1], espacio de trabajo colaborativo en el que la EIIC ha conseguido establecer en ecosistema de aprendizaje basado en la implantación de prácticas educativas abiertas. El objetivo principal es aplicar los conocimientos técnicos adquiridos en la titulación para diseñar un recurso que aporte una mayor accesibilidad a materiales educativos y de ocio, a la vez que se ponen en práctica muchas habilidades blandas demandadas cada vez más por los empleadores. La hipótesis central es que un enfoque colaborativo, basado en el diseño centrado en el usuario final, podría generar un recurso mejor adaptado a las necesidades reales del colectivo al que se orienta.

2. METODOLOGÍAS

Se han puesto en práctica en este trabajo las siguientes metodologías:

Aprendizaje-Servicio (ApS): Se trata de una metodología que se ha introducido con mucha fuerza en todos los niveles del ámbito educativo, y entre ellos en la universidad. Requiere que siempre debe aparecer conjuntamente un servicio en la atención a una necesidad de la comunidad y un aprendizaje académico de los estudiantes que lo prestan. El servicio puede ser directo a personas o colectivos, al entorno cultural o medioambiental, o con tareas de sensibilización y reivindicación [2]. En el caso de la experiencia desarrollada, implicó colaborar estrechamente con usuarios finales y expertos del sector de la accesibilidad y educación, para garantizar que el recurso desarrollado respondiera adecuadamente a las necesidades de niños con ceguera.

Diseño de Experiencias de Aprendizaje (LXD): Es una disciplina del diseño que se focaliza en lograr experiencias enriquecidas, y se diferencia de otras en que sirve al único propósito de aprendizaje, desde una visión integral, global e interdisciplinar [3]. Se investigaron las necesidades del colectivo, realizando un proceso de co-creación con los usuarios finales para asegurar que el diseño del recurso educativo respondiera a sus requerimientos. El proceso incluyó la elaboración de prototipos, evaluación y ajuste con base en las pruebas con los usuarios.

Maker Education: Surgida de la implantación en el ámbito educativo de los valores del movimiento Maker para el desarrollo de productos mediante procesos colaborativos que fomentan el aprendizaje experiencial, donde el estudiante emplea tanto herramientas manuales como nuevas tecnologías de fabricación digital [4]. En esta experiencia se emplearon materiales propios del sector educativo y se usaron tecnologías como el fresado CNC, el corte y grabado por láser, y el termoconformado de láminas plásticas.

3. RESULTADOS Y CONCLUSIONES

El resultado final fue el desarrollo de un juego educativo inclusivo surgido una adaptación versátil y accesible del clásico juego de memorización por emparejamiento de cartas. El juego busca fomentar el desarrollo de habilidades cognitivas, como la atención y la memoria, sociales, como la empatía y la comunicación, y sensoriales, como el sentido táctil y la memoria espacial. Está compuesto por ocho parejas de tarjetas táctiles texturizadas y un tablero modular para posicionarlas

en la mesa de juego. Se ha realizado una guía con las recomendaciones de diseño para este tipo de recursos que permite personalizarlo para diferentes temáticas, objetivos de aprendizaje, modalidades de juego y público objetivo.

Las pruebas piloto realizadas con usuarios de diferentes edades y en distintos entornos ha demostrado la efectividad de las soluciones propuestas en el recurso y pusieron en manifiesto su capacidad para promover la sensibilización. De la retroalimentación de los usuarios y profesionales se ha recibido una valoración muy positiva del recurso, así como la necesidad de más materiales didácticos que permitan que los niños y adultos puedan compartir momentos de ocio juntos, independientemente de sus condiciones.

El recurso didáctico desarrollado cumplió con los objetivos de accesibilidad, inclusión y aprendizaje, mediante una solución educativa innovadora, y también ha evidenciado el valor de la integración de metodologías como el ApS, el LXD y el *Maker Education*, en la formación universitaria para el trabajo tanto de competencias específicas como transversales. Fomenta el compromiso social, la motivación, la conciencia del alcance positivo que pueden tener competencias adquiridas en la titulación, así como el crecimiento profesional y personal del estudiante.

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Procedimientos para la adquisición de competencias personales y profesionales en estudiantes universitarios: aplicación desde las Ciencias jurídicas

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* Grupo de Innovación Educativa ULPGC (GIE-82) sobre competencias psicosociales y profesionales desde las Ciencias Jurídicas de la Universidad de Las Palmas de Gran canaria

RESUMEN EXTENDIDO

1. INTRODUCCIÓN

El Grupo de Innovación Educativa sobre competencias psicosociales y profesionales desde las Ciencias Jurídicas (y otros ámbitos del conocimiento) se ha constituido para favorecer el desarrollo competencial de los estudiantes en el campo de las Ciencias Jurídicas. La visión del grupo tiene como principios ayudar y "ayudar a ayudar" a generar ecosistemas de conocimiento, con la ayuda de las NNTT, desde el ámbito de la docencia e investigación. El **propósito** de esta comunicación es compartir y dar a conocer el procedimiento que hasta este momento ha llevado a efecto un grupo de profesores y profesoras de la Facultad de Jurídicas principalmente (y también de otras ramas del conocimiento) para ayudar a desarrollar competencias personales y profesionales en nuestros estudiantes, y comentar los primeros resultados obtenidos.

Para ello se plantearon los siguientes **objetivos**:

- Constituir el grupo de docentes como GIE y diseñar objetivos, fines y diseño del grupo para tener un marco general común de actuación.
- Discutir y seleccionar las competencias personales y profesionales que deben ser desarrolladas por los estudiantes a los que impartimos docencia.
- Determinar la metodología específica a llevar a cabo.
- Elaborar un cuestionario previo de necesidades percibidas por los estudiantes sobre dichas competencias, para determinar o no la pertinencia de su implementación.
- Formar al GIE en los aspectos competenciales que serán luego motivo de implementación instruccional, tanto de competencias personales como profesionales.
- Preparar los problemas, situaciones o "caso" a resolver en el aula.
- Ejecución de los reactivos, tanto en clase como en "aula-taller-laboratorio".
- Evaluar las sesiones o casos, planteando evidencias a recoger en Moodle, tanto en repositorios específicos, como en foros, tanto del contenido como del grado de satisfacción del desarrollo de la sesión.
- Hacer seguimiento y profundización de lo trabajado, a través del repaso de repositorios como del banco de grabaciones que se hayan podido realizar.

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- Evaluar los aprendizajes, a través de ejercicios competenciales tanto personales como profesionales.

Como **hipótesis** de trabajo se planteó que los estudiantes, aunque pudieran tener cierta creencia de adecuadas competencias personales y profesionales, mayoritariamente estarían conformes en trabajar estos aspectos en el aula a través de la asignatura correspondiente, y que participarían activamente tanto a nivel de intervención directa como de observadores y evaluadores de los casos que se presenten. También se plantea como **segunda hipótesis** que utilizando el "método del caso" los estudiantes conseguirán de forma adecuada, satisfactoria y será una metodología que produzca mayor motivación para adquirir competencias.

2. METODOLOGÍA

La **metodología** de trabajo es doble:

Por un lado, se plantea una **metodología participativa entre el profesorado** que compone el GIE, tanto en la construcción como la implementación del cuestionario inicial, como en la formación (en este caso, autoformación dentro del GIE por personas con más conocimiento en la materia) sobre competencias personales y profesionales; de otro lado, se propone como estrategia metodología a seguir el "Método del Caso" como herramienta didáctica y formativa, adaptado al desarrollo competencial. Gracias al análisis de casos reales, el método del caso conecta la teoría con la práctica. El método del caso es una metodología de aprendizaje basada en el learning by doing (aprender haciendo) y que tiene como objetivo preparar a los alumnos para la toma de decisiones estratégicas en el ámbito laboral a través de la práctica de situaciones reales.

3. RESULTADOS Y CONCLUSIONES

Como **resultados** más interesantes hasta ahora obtenidos, hay que destacar el listado de cuatro competencias profesionales y seis personales obtenidas luego de la reflexión grupal realizada, y la propuesta de cinco macro indicadores competenciales (comunicación social, interacción social, responsabilidad, gestión socioemocional, gestión de grupos y equipos de trabajo). También se obtuvo la evaluación de percepción de competencias personales y profesionales de los estudiantes, donde más del 90% de ellos son partidarios del trabajo en clase de dichas competencias personales y profesionales. Igualmente se ha llevado a efecto la preparación de los primeros reactivos, y su ejecución en clase, siendo las primeras valoraciones positivas a su implementación, lo que hace reafirmar las dos hipótesis planteadas.

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Las auditorias ambientales como asignatura sobre la que implantar material docente digital y no digital

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Keywords: Auditoría ambiental, material digital educativo, docencia, auditorías ambientales

RESUMEN AMPLIADO

Las auditorías ambientales son evaluaciones sistemáticas de actividades empresariales para garantizar el cumplimiento de normas ambientales y la eficiencia en el uso de recursos. Estas evaluaciones analizan impactos ambientales, identifican áreas de mejora y proponen soluciones sostenibles. Al fomentar la transparencia y responsabilidad, las auditorías ambientales promueven la gestión ambiental responsable y la reducción de riesgos para el medio ambiente. Además, contribuyen a mejorar la reputación corporativa y la competitividad, de la empresa u organismo, en un mundo donde la sostenibilidad es cada vez más valorada [1].

Los recursos digitales han transformado la educación al brindar acceso a una amplia variedad de herramientas y contenido en línea. Desde plataformas de aprendizaje hasta aplicaciones interactivas, estos recursos amplían el alcance de la enseñanza, fomentan la personalización del aprendizaje y estimulan la colaboración e interacción entre estudiantes y docentes. Además, facilitan un proceso de aprendizaje más dinámico y accesible, adaptado a las necesidades individuales de los alumnos, facilitando así la adquisición de conocimientos en la era digital [2], [3]. Por tanto, tomando como base las dos ideas descritas previamente, el principal objetivo de este trabajo es ayudar a los alumnos de la asignatura "Sistemas de Gestión y Auditorías Ambientales" del Grado en Ciencias Ambientales a una mejor comprensión de las auditorias ambientales, impartidas en el tercer bloque de la asignatura cursada en la Universidad de Córdoba. Para ello se ha creado material educativo para que los futuros alumnos cuenten con recursos más prácticos y aplicados. Estos recursos docentes son un póster, dos vídeos explicativos y un vídeo de una simulación de situación real que han sido creados mediante programas tecnológicos, como son Canva, Powtoon y Filmora. Además, para fomentar la participación del alumnado de forma directa y facilitar la adquisición de algunas de las competencias de la asignatura se ha creado un juego didáctico, de manera que facilita la fijación de conceptos y los alumnos aprenden jugando. El póster ha sido elaborado mediante una aplicación llamada Canva (https://www.canva.com/), que es una herramienta online de diseño gráfico que permite diseñar y editar de manera rápida y sencilla cualquier tipo de material que se desee, desde modificar una imagen hasta elaborar un vídeo profesional. Esta herramienta es muy conocida entre los estudiantes ya que es muy intuitiva y tiene mucha variedad de plantillas dinámicas para poder crear presentaciones. Está hecho con la idea de que el alumno pueda, de un vistazo controlar lo más destacado de una auditoria ambiental con el fin de que el estudiante afiance conceptos y pueda recurrir a él para recordar los aspectos más importantes de manera genérica. En cuanto a los 3 videos realizados, los dos primeros han sido realizados con powtoon y tratan sobre los pasos a seguir para planificar una auditoria ambiental y cómo se ejecuta una auditoria ambiental tras su previa planificación. En cuanto al tercer video, se titula "Simulación de una auditoría ambiental" y ha sido montado mediante canva, y el programa informático Filmora (Figura 1). La historia de este vídeo se desarrolla en la empresa "Ecolab", que es la empresa interesada en obtener la certificación de su SGA. Esta empresa es un laboratorio cuya función es la realización de análisis y mediciones de distintos componentes ambientales, tales como el agua, el aire o el suelo. "Ecolab" contacta con AENOR para que un equipo auditor pueda auditar ambientalmente su empresa y certificar que su SGA está bien implantado. El juego didáctico realizado es una réplica adel conocido juego de cartas llamado "memorama" (Figura 2). Este juego de mesa se realiza con una baraja de cartas con la particularidad de en estas cartas pueden aparecer figuras, personajes, escenarios, etc. El objetivo de este consiste en encontrar la pareja de la carta que contenga la misma figura utilizando la memoria, ya que las cartas son barajadas y colocadas boca abajo, para que no exista la posibilidad de verlas de forma continua. De este modo, se ejercita la memoria ya que si levantas las dos cartas y no coincide la figura se deberá volver a poner boca abajo intentando memorizar qué posición ocupaba. Una vez realizados los recursos digitales y no digitales, se llevaron a clase y pudo comprobarse como la implementación de recursos educativos digitales en el tercer bloque teórico de la asignatura ha ofrecido una serie de ventajas significativas que pueden potenciar el proceso de aprendizaje de los estudiantes. En primer lugar, destaca la capacidad de captar la atención del alumno al presentarle contenido de manera innovadora y atractiva.

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En segundo lugar, han permitido presentar el contenido de forma más visual e informal, facilitando la comprensión y retención de la información por parte de los estudiantes.

Por último, ha motivado a los estudiantes a interactuar de manera más frecuente con el material de estudio.

Figura 1. Cronograma para la ejecución del vídeo "Simulación real de una auditoría ambiental".

Figura 2. Modelo de cartas para el juego "Memorama ambiental".

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Creación de material educativo y divulgativo sobre Microbiología para su utilización en el Tercer Ciclo de Educación Primaria

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Palabras clave: microorganismos, recursos didácticos, educación primaria, conceptos de los estudiantes

RESUMEN EXTENDIDO

Muy pocos contenidos relacionados con la Microbiología se tratan en Educación Primaria. Por ello planteamos un estudio cuasi experimental, descriptivo, cuantitativo y observacional, con un diseño pre- y post-test después de una intervención educativa, que analiza las ideas que los alumnos de Tercer Ciclo de Primaria tienen sobre los microorganismos.

Se organizaron dos sesiones de 2 horas, dos días diferentes en dos colegios públicos, con alumnado de 5º en uno de ellos, y con alumnado de 6º en el otro. En la primera parte de cada sesión, de fundamentación teórica (charlas), clarificamos todos los conceptos necesarios. En la segunda, práctica, con recursos fáciles de conseguir por los centros educativos y económicos, convertimos el aula en un laboratorio donde los alumnos experimentaron de forma lúdica, para aumentar su interés por la Microbiología en particular y las ciencias en general. Las actividades realizadas fueron: preparación de medios de cultivo caseros, cultivo de muestras de espacios del colegio y corporales (entre ellas antes y después de lavarse las manos), observación de los cultivos, carrera de masa de pan, simulación de transmisión a través del estornudo y de saludo de manos, observación del efecto de medidas (alcohol, povidona iodada) para controlar las infecciones.

Se diseñó un cuestionario que se administró en dos momentos, previo (80 estudiantes, 33 de 5º curso y 47 de 6º) y posterior a la intervención (82 estudiantes, 37 de 5º curso y 45 de 6º). La edad media de los estudiantes que rellenaron el cuestionario fue de 11 años. Dio como resultado un amplio conjunto de datos y proporcionó información sobre el nivel de conocimiento y la progresión de las ideas acerca de los microorganismos de los estudiantes.

Los resultados muestran, en general, una concepción previa negativa y limitada de los microorganismos centrada en su aspecto como agentes patógenos, desconociendo que realizan funciones vitales, así como la diversidad y ubicuidad microbiana. Se pretendió reorientarlos y proporcionar una visión más amplia y equilibrada de los perjuicios-beneficios de los microorganismos en su vida cotidiana y fundamentar curricularmente la realización de actividades relacionadas con la Microbiología.

Considerando la importancia de saber dónde reciben la información sobre los microorganismos, el colegio (57,5%) es la principal fuente, igual que en otros estudios españoles (33,55%) [1]. Le siguen los programas de televisión (37,5%).

La idea de que los microorganismos son demasiado pequeños para ser vistos a simple vista y es necesario un microscopio, es aceptada por una gran mayoría (>74%) de los alumnos, como en otros estudios [1,2].

Con respecto al lugar donde se pueden encontrar microorganismos, el alumnado comprende bien la presencia de estos en el medio ambiente (suelo, aire, agua, …), siendo la respuesta más elegida (> 80%), como en otros trabajos [3]. Le sigue en frecuencia “En las personas enfermas”, reflejando la conexión microorganismo-enfermedad. Después de las actividades se observa un incremento del conocimiento acerca de los sitios donde podemos encontrar a los microorganismos. El aumento significativo en el ítem, “En las personas sanas”, puede estar relacionado con la actividad en la que tomaban muestras de algunas zonas de su cuerpo para cultivarlas y con la del lavado de manos. La observación del crecimiento de los microorganismos que provienen de ellos, estando sanos, les convence de que las personas sanas también tienen microrganismos. Igual que aumenta en la respuesta “En la fabricación del pan intervienen los microorganismos”, puede estar relacionada con la actividad “carrera de masa de pan”, una de las que más le ha gustado, sobre todo a los estudiantes de 6º y les indica su utilidad.

A la pregunta si conocen alguna enfermedad infecciosa causada por microorganismos, sólo un 22% contestan que sí, aunque sí es la COVID-19 la infección más citada (18%). Mayor número de estudiantes de 6º que de 5º respondieron que sí.

El nivel de conocimientos respecto a cómo evitar que los microorganismos produzcan infecciones fue aceptable. El lavado de manos fue la medida más indicada (85-88%). Esta respuesta era de esperar tras la pandemia y ser una de las recomendaciones más indicadas, resultado similar a la de estudiantes de otras provincias españolas [3] pero más altos que

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los descritos de Italia (30%) [4]. Algo más de la mitad señalaron "la mascarilla" (62-67%) y "quedándome en casa si tengo fiebre" (60-64%). En la actividad del estornudo pudieron comprobar cómo la mascarilla protegía de la propagación del agua coloreada a los estudiantes cercanos.

La segunda propuesta de nuestros estudiantes fue, por un lado, limpiar y desinfectar los baños y, por otro, el empleo de vacunas, (78-74%), muy superior a las de otros trabajos [3,4]. El alumnado tiene claro que la temperatura, tanto baja como alta, afecta a los microorganismos, ya que para la prevención de las infecciones a través de los alimentos más de la mitad (50-52%) indican "Guardar los alimentos en la nevera" y tiene un porcentaje superior (71-68%) el ítem de "Cocinar los alimentos adecuadamente" que implica altas temperaturas.

El consumo de antibióticos resultó la medida menos sugerida para evitar infecciones, por falta de conocimiento de que se pueden usar medicamentos para luchar contra las infecciones o quizás debido a las campañas de lucha contra la resistencia a los antibióticos en la que se insiste en no usarlos sin indicación médica y en que no sirven para los catarros.

Aunque tienen claro (78-80%) que "beber lejía" no sirve para evitar coger infecciones, las opciones "Con musicoterapia" (37-42%) o "Usando protección solar" (38-28%) tienen un porcentaje relativamente alto de respuestas incorrectas.
Junto al post-test se administró también un cuestionario de satisfacción al alumnado que valoró positivamente todas las actividades con una valoración global del proyecto superior a 4 (sobre un máximo de 5). Además, elaboraron propuestas de mejora. El alumnado de 5º sugirió la incorporación de juegos, de algún Kahoot e incluso demandó la realización de más actividades. El alumnado de 6º por otro lado, reclamó así mismo más actividades y el uso del microscopio.

CONCLUSIONES

Las actividades relacionadas con la Microbiología pueden responder a algunos de los objetivos descritos en la asignatura "Conocimiento del Medio Natural, Social y Cultural". Las actividades se pudieron llevar a cabo con recursos sencillos que están al alcance de cualquier colegio de Educación Primaria. Los estudiantes fueron capaces de realizarlas con entusiasmo y reflejan un nivel de satisfacción elevado.

El conocimiento del alumnado de Tercer Ciclo de Primaria sobre los microorganismos es más limitado en cuanto a sus características que respecto a las medidas para evitar contraer enfermedades infecciosas. En general, se observa que los conocimientos y actitudes relacionadas con los microorganismos mejoran tras la intervención.

Existen recursos gratuitos de laboratorios virtuales que pueden proporcionar una alternativa a la escasez de medios, presupuestos y espacios para la realización de actividades prácticas. En las siguientes páginas se pueden encontrar algunos de ellos aunque están enfocados más para estudiantes de secundaria y niveles educativos superiores: https://biomodel.uah.es/lab/inicio.htm, https://learn.chm.msu.edu/vibl/index.html, https://www.educaplus.org/games/biologia, https://learn.genetics.utah.edu/content/labs/. Un planteamiento futuro podría ser la creación de laboratorios virtuales adaptados a educación primaria, lo que complementaría el aprendizaje experimental que se plantea con esta intervención.

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Innovación en la Enseñanza de Anatomía Veterinaria: Creación de Vídeos Educativos por Estudiantes como Herramienta de Aprendizaje en el Laboratorio

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Keywords: Anatomía Veterinaria, Vídeos Educativos, Aprendizaje Activo, Uso de Móviles en la Enseñanza.

1. INTRODUCCION

La neuroanatomía es una disciplina clave en la enseñanza de la anatomía veterinaria. Esta disciplina abarca el estudio del sistema nervioso y las regiones asociadas, las cuales tienen un papel fundamental en la formación médica [1]. Sin embargo, la enseñanza de esta área enfrenta desafíos debido a la reducción de programas académicos y la falta de personal capacitado, lo que impacta negativamente en la calidad educativa [2,3,4]. El procesamiento de muestras anatómicas es un trabajo costoso y laborioso, y las nuevas tecnologías, como las imágenes tridimensionales, han ayudado a compensar estas dificultades, aunque su elevado coste limita su uso. Tradicionalmente, se han utilizado disecciones, técnicas de plastinación y de conservación, pero el acceso a estas herramientas depende de la obtención de especimenes. Todos estos factores han conducido a que los estudiantes dediquen más tiempo al aprendizaje autónomo. Afortunadamente, el avance tecnológico ha democratizado el acceso a recursos de aprendizaje, incluyendo las plataformas de video, las redes sociales y otros medios online, los cuales permiten a los estudiantes reforzar sus conocimientos sin necesidad de la asistencia presencial. Un estudio reciente realizado en estudiantes de veterinaria reveló que el 100% de los estudiantes encuestados utilizaban videos para complementar su aprendizaje en anatomía, destacando que aunque los videos no sustituyen la enseñanza con cadáveres, son una herramienta eficaz en el proceso educativo [5]. Durante la pandemia, el uso de videos de disección en la enseñanza remota fue clave para mantener la calidad educativa, permitiendo a los estudiantes revisar conceptos de forma flexible y repetida, optimizando su preparación para las clases prácticas [6]. Teniendo en cuenta estos antecedentes, el propósito de nuestra investigación fue elaborar un modelo de presentación de trabajos en video con evaluación por pares en el contexto de anatomía veterinaria con el fin de mejorar la adquisición de conocimientos y la orientación espacial de los estudiantes.

2. METODOLOGÍA

La metodología utilizada en este trabajo se basa en un enfoque innovador implementado en la asignatura de Anatomía Veterinaria II de la ULPGC del Grado en Veterinaria. El programa teórico incluye presentaciones en PowerPoint, videos, esquemas y recursos de internet, mientras que las sesiones prácticas se centran en la disección anatómica y estudio de cortes anatómicos en los diferentes planos del espacio procedentes de mamíferos domésticos. En este contexto, se llevó a cabo un cambio metodológico que involucra a los estudiantes en la creación de vídeos durante el desarrollo de las sesiones prácticas, (Figura 1).

Los estudiantes utilizaron dispositivos móviles para grabar vídeos en los que señalaban características morfológicas específicas de los órganos estudiados, con narraciones que explican los elementos clave de cada práctica. Estos vídeos son luego intercambiados entre los estudiantes para fomentar la evaluación por pares.

El modelo propuesto consta de tres fases: la primera es la fase de registro, en la que los estudiantes capturan vídeos de las muestras anatómicas durante las prácticas bajo la supervisión del profesor; la segunda es la fase de intercambio, donde los vídeos se comparten entre los compañeros mediante plataformas digitales; finalmente, la fase de revisión implica que los estudiantes evalúan la calidad de los vídeos, con un enfoque en la parte teórica de los señalamientos y las narraciones.

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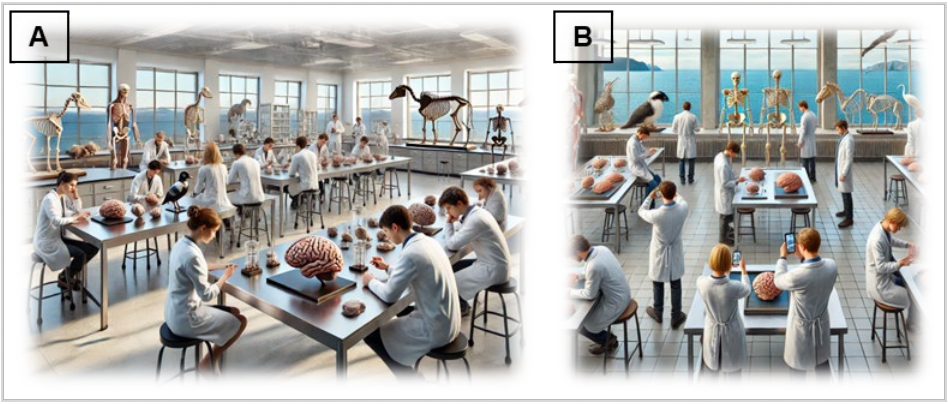

Figura 1. Infografía[†] de las prácticas laboratorios: A) método clásico B) registrando la actividad con dispositivos móviles.

3. RESULTADOS Y CONCLUSIONES

El análisis de los resultados se centra en el impacto positivo de los vídeos creados por los estudiantes en el proceso de enseñanza de la Anatomía Veterinaria II. De los 87 estudiantes matriculados en el curso académico 2024/25, 50 respondieron a la encuesta de satisfacción, lo que permitió evaluar el uso de los vídeos. Los resultados indicaron que el 64% de los estudiantes valoraron positivamente la calidad de las prácticas, destacando que los vídeos facilitaban la visualización de las estructuras anatómicas específicas. Además, el 90% de los estudiantes afirmó que los vídeos mejoraban su comprensión de los contenidos teóricos, mientras que el 60% los recomendó como herramienta para otras asignaturas. En términos de motivación, el 48% de los estudiantes consideró que los vídeos hacían las prácticas más entretenidas, y el 46% indicó que aumentaban su motivación para aprender.

En cuanto a las competencias, el 60% de los estudiantes afirmó que los vídeos les ayudaron a mejorar sus habilidades en la identificación y estructura de los órganos, mientras que el 68% reconoció que fomentaronn el trabajo en equipo, y el respeto por las contribuciones de sus compañeros. Los comentarios libres reflejaron un enfoque positivo hacia las prácticas y los vídeos, destacando su utilidad como recurso para el estudio y preparación de los exámenes.

En conclusión, los vídeos no solo complementaron el aprendizaje tradicional, sino que también contribuyeron al desarrollo de competencias transversales. Este estudio sugiere que los vídeos son una herramienta valiosa en la enseñanza de anatomía. Estudios futuros en este campo por nuestro grupo propondrían incorporar vídeos interactivos y evaluaciones automatizadas para optimizar su uso.

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Integrating AI tools into journalistic and academic writing: A student-led, interdisciplinary approach to improve academic skills in higher education

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Keywords: higher education, AI tools, text generation, scientific research, journalism

1. INTRODUCTION

The rapid advancement of artificial intelligence (AI) is transforming education by introducing innovative tools for learning and teaching. Generative AI, in particular, has grown significantly, offering personalized learning materials and instant feedback that enhance student motivation and engagement [1]. In higher education, tools like ChatGPT are increasingly important, as a study [2] highlights the opportunities and challenges they present, emphasizing the need to adapt teaching methods to develop students' digital skills. ChatGPT is valuable for creating personalized learning plans and automating repetitive tasks [3]. In software engineering education, research [4] indicates that AI-powered tools revolutionize the field by providing customized explanations and immediate feedback, aiding both students and lecturers in understanding programming concepts. However, human review remains essential to ensure documentation quality [5]. Additionally, ePortfolios are recognized as valuable for reflecting on learning processes and showcasing digital competencies [6]. To foster practical awareness of AI text generation tools, we implemented an interdisciplinary module (IDM) titled "AI Text Generation Tools in Media Companies" in the summer semester of 2024, involving 22 students and three lecturers from computer science, didactics, and journalism. The module focused on writing newspaper articles using AI tools like fobizz-tools, which were tested concurrently at our university, with articles published via the ePortfolio system Mahara. Topics covered included AI text generation fundamentals, ethical AI use, data protection, and bias. This initiative equipped students with essential skills in scientific research, interviews, and publication, culminating in their final thesis. This paper provides an overview of the IDM, the tools used, and the insights gained from this interdisciplinary educational experience.

2. TEACHING CONCEPT

The IDM concept focused on teaching students how to produce newspaper articles and other publications while working in teams and utilizing the latest AI tools. The goal was to enhance their skills in AI tool usage and basic publication writing. Throughout the course, students set up a website for a fictitious company, published their articles, and presented them publicly. By the end, all articles were published on the company's website, with selected pieces potentially featured in a publisher's media channels. Learning objectives included media design, ethics, law, feedback, and collaboration. Students worked in groups on their articles and received feedback, with the best contributions having the opportunity for real media publication. The course was structured as a learning curve, progressing from AI basics to media literacy, focusing on writing fundamentals, AI-supported research, and the completion and publication of journalistic articles.

3. TOOLS

During the IDM, several tools were utilized, with Moodle serving as the primary Learning Management System (LMS) for course management, providing a structured framework with 12 topics. Mahara was used as an ePortfolio system for creating and publishing journalistic articles, functioning as a content management system linked to Moodle for group work and feedback. It supports documentation, reflection, and collaboration among students. Fobizz tools were also employed for AI text and image generation, aimed at assisting educators in managing digital transformation in education. These tools focus on teaching digital skills and integrating AI into the classroom, featuring functions like an AI chat for dynamic

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communication and recommendation systems for personalized learning. In summary, Moodle was used for course management, Mahara for article creation and content management, and Fobizz tools for AI support in generating journalistic content, promoting individual learning and collaboration.

4. SETTING

The semester assignment for an interdisciplinary module involved students writing journalistic articles to enhance their skills in AI and academic writing. The goal was to familiarize them with journalistic writing while integrating AI applications and scientific methods. Exercises included transforming police reports into news articles, breaking down writing tasks, and testing AI and plagiarism detection tools. Students were introduced to various AI tools and required to develop a strategy for their use in writing. In collaborative sessions, students identified common writing tasks and outlined the necessary steps to complete them. They assessed the potential of AI tools to support the writing process, tested different tools, and documented their findings. The assignment involved several intermediate steps, including brainstorming, topic selection, and creating exposés presented for feedback. Final articles were published in Mahara, and students reflected on their experiences and challenges after the project, which also included an evaluation of cooperation and task distribution.

5. EVALUATION

At the beginning of the course, students were asked to self-assess their skills through a survey. At the end of the course there was a final survey with free text answers in which the students reflected on their learning progress. The answers were categorized and grouped thematically. Based on the assumption that fundamental topics such as technical understanding and application skills are potential learning areas, these were rated on a scale of 1 to 3 (1 = low learning gains, 3 = high learning gains). The results of the final survey show progress in understanding and skills in using generative AI tools. Technical skills and application knowledge in particular were identified as important learning areas. Students reported that the AI tools significantly improved the writing process, both in terms of efficiency and text quality.

6. CONCLUSION AND OUTLOOK

The integration of AI tools into the module was essential for enhancing students' understanding and efficiency in journalistic and academic writing. The final survey indicated progress in skills related to generative AI, with students valuing technical skills and practical applications. Feedback was mostly positive, though some concerns about Mahara's usability were noted. Interdisciplinary collaboration improved professional understanding and motivation. Plans for the summer semester of 2025 include a new module, "From Text to Podcast: AI at Schwartzkopff-Media," which will allow students to create both articles and audio content, further preparing them for future challenges in the digital media landscape.

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Fostering autonomous learning in higher education through AI: effectiveness and student satisfaction

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Keywords: Artificial Intelligence, Autonomous Learning, e-Learning, Virtual Assistant.

EXTENDED ABSTRACT

INTRODUCTION: The integration of Artificial Intelligence (AI) into higher education is transforming traditional learning paradigms by offering personalized learning experiences, real-time feedback, and adaptive learning paths [1]. These tools play a crucial role in fostering autonomous learning, where students take control of their educational journeys—a key factor in developing critical thinking, problem-solving, and lifelong learning skills. Effective autonomy, however, requires structured support, which AI provides through tailored educational experiences and timely guidance. By personalizing learning paths and offering immediate feedback, AI tools have the potential to make learning more accessible and efficient [2], encouraging students to engage more deeply with the material.

This research investigates the effectiveness of AI in promoting autonomous learning across various subjects in higher education, focusing on AI applications such as intelligent tutoring systems and adaptive learning platforms. The study aims to uncover key factors that contribute to successful AI-enhanced self-directed learning environments. The hypothesis proposes that AI-driven tools can significantly improve student engagement and academic performance by providing real-time feedback and personalized support, thus helping students manage their studies more effectively.

To achieve these objectives, the study examines two main aspects: the effectiveness of AI in fostering autonomous learning and the level of student satisfaction with AI tools. It explores whether AI applications not only enhance performance but also lead to greater student satisfaction by providing accessible, accurate information and support. The research analyzes feedback from students to identify the strengths and limitations of AI in education, offering insights into how these technologies can be further optimized to support learning in higher education. Through this exploration, the study aims to contribute valuable knowledge on how AI can be integrated into academic settings to enhance both learning outcomes and student experiences.

METHODOLOGY: The study was conducted across multiple subjects within different engineering degree programs at the Universidad Politécnica de Madrid, involving over 180 students. Three key subjects were selected: Chemistry, Conventional and Renewable Energies, and Geophysics, each with distinct academic challenges. In Chemistry, students solved a series of progressively complex exercises that were also proposed to ChatGPT versions 3.5 and 4. The goal was to compare AI's accuracy and reasoning with student responses, particularly as the difficulty of the problems increased. This allowed researchers to observe patterns in how AI handled both theoretical and mathematical tasks.

In Conventional and Renewable Energies, students were encouraged to use AI applications like ChatGPT to assist in exam preparation. They were provided with a list of questions before exams and could compare AI-generated answers with those discussed in class. At the end of the course, students completed a survey on their AI usage and its perceived effectiveness. This assessment helped evaluate the role of AI in facilitating understanding and improving student performance, particularly regarding its reliability as a study tool.

Geophysics presented a more complex application of AI, where students used it to interpret resistivity sections in geophysical prospecting tasks. The process involved students creating prompts for ChatGPT to analyze specific geophysical data, followed by a comparison of AI's interpretation with the students' own. The evaluation focused on the accuracy of AI-generated analyses and the relationship between the quality of student prompts and AI responses, providing insight into the potential and limitations of AI in handling subjective, non-deterministic tasks.

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RESULTS AND DISCUSSION: In Chemistry, AI tools performed well when addressing theoretical questions, often providing accurate and detailed explanations similar to those produced by students. However, as the complexity of exercises increased, particularly those requiring mathematical calculations, AI's performance deteriorated. While ChatGPT 4 consistently achieved better results than ChatGPT 3.5, both versions struggled with more advanced concepts, leading to errors that were easier to distinguish from student-generated responses.

For Conventional and Renewable Energies subject, students reported mixed results regarding their use of AI tools to prepare for exams. Over 70% of students used AI applications, and of those, nearly 40% found them helpful in clarifying concepts and providing additional information that enhanced their understanding. However, around 54% noted that AI's responses were sometimes inaccurate or confusing, which led to skepticism about fully relying on these tools for study. Despite this, students who critically engaged with AI—by cross-referencing its answers with their own knowledge—tended to achieve higher exam scores compared to those who solely relied on traditional study methods.

Geophysics case presented unique challenges, as AI was tasked with interpreting resistivity sections, a complex, subjective process involving qualitative analysis. While students were able to generate prompts for ChatGPT to analyze geophysical data, the AI's responses often lacked the depth and accuracy required for valid interpretations. The AI sometimes misinterpreted the data, focusing on superficial elements like color scales rather than the underlying resistivity values. Despite this, the exercise proved valuable in encouraging students to critically evaluate the AI's outputs and refine their own geophysical reasoning.

Across all subjects, the correlation between the quality of student prompts and AI responses was evident. In general, better-structured prompts led to more coherent AI outputs, though discrepancies still arose, particularly in non-deterministic tasks like those in Geophysics. These findings highlight the importance of prompt engineering and suggest that AI tools, while useful, require careful oversight and human intervention to ensure the accuracy and relevance of their outputs.

Overall, results demonstrate that AI can be a valuable tool in supporting autonomous learning, particularly in tasks involving theoretical understanding and straightforward problem-solving. However, its limitations in handling complex calculations and subjective interpretations indicate that AI should be used as a complementary tool rather than a substitute for traditional learning methods. Moreover, the need for critical engagement with AI-generated content is crucial for students to maximize its educational benefits.

CONCLUSIONS: The study concludes that AI-driven tools can substantially enhance autonomous learning by providing immediate, personalized feedback, which helps students manage their study time and improves their understanding of complex concepts. Despite some limitations, such as errors in complex problem-solving and a lack of ability to generate qualitative insights in fields like Geophysics, AI has proven to be a valuable complementary tool in higher education.

Student satisfaction was generally high, with most students acknowledging the utility of AI in clarifying concepts and improving their study efficiency. However, the study highlights the need for students to critically engage with AI-generated content, as AI may not always provide accurate or contextually appropriate responses.

In conclusion, the integration of AI in higher education has the potential to transform learning, enhancing student autonomy and satisfaction. To maximize its benefits, careful implementation, along with ongoing training for both students and professors, is essential. While AI shows promise in reshaping educational practices, its limitations must be understood and mitigated to fully harness its potential in promoting autonomous learning in higher education.

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Study on the Effect of an Individualized Intervention in High School Students Using Large Language Models

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Keywords: ChatGPT, personalized learning, motivation, secondary education.

1. INTRODUCTION

1.1 Purpose

The purpose of the study is to investigate the impact of personalized learning activities, using ChatGPT-3.5, on student motivation and academic performance in secondary school technology courses [1]. The levels of the study are 1st, 2nd, and 3rd year of Compulsory Secondary Education in the subject of *Tecnología y Digitalización* (Technology and Digitalization), as well as for 1st year of Baccalaureate in the subject of *Tecnología e Ingeniería I* (Technology and Engineering I). Classroom research was conducted with the aim of improving student motivation and relating it to their academic performance [2].

1.2 Objectives

The primary objective of this study is to employ a Large Language Model (LLM) to customize prompts, resulting in a set of personalized exercises aligned with students' preferences and interests [3]. This aims to address the question of whether the incorporation of personalized exercises has an impact on both student motivation and academic performance [1]. As secondary objectives, this study seeks to analyze the motivational impact of meaningful learning facilitated by personalized exercises using the aforementioned tool [4]. This arises from the need to understand how adapting prompts to students' interests influences their motivation toward the subject [4].

1.3 Hypothesis

Null Hypothesis (H0): The implementation of personalized exercises based on students' preferences and interests has not had a significant impact on their motivation towards the subject. Also, the implementation of personalized exercises based on students' preferences and interests has not had a significant impact on their academic performance.

Alternative Hypothesis (H1): The implementation of personalized exercises based on students' preferences and interests has had a significant impact on their motivation towards the subject. Also, the implementation of personalized exercises based on students' preferences and interests has had a significant impact on their academic performance.

2. METHODOLOGY

The research involved dividing the syllabus into two parts. The first part of the syllabus served as a control and was carried out using a traditional methodology, while the second part was conducted using a personalized activity methodology. The activities were personalized through an initial survey where students reflected upon their interests, as well as their initial level of motivation towards the subjects. ChatGPT-3.5 was then asked to customize generic exercises based on the students' preferences. Part of the syllabus was then taught using generic activities, and another part with the personalized activities. Finally, the students were evaluated through an academic test and a final survey that reflected their final motivation levels and their experience during the intervention. The statistical study was conducted with a sample of 72 students distributed across different grades.

When analyzing the survey results, mathematical methods were employed to evaluate the data. Among these methods, box-and-whisker plots were used to visualize the motivation levels in each group before and after the intervention. To assess statistical significance, the McNemar test was applied. Additionally, the Wilcoxon signed-rank test was used as another mathematical validation of the results to determine their statistical significance. Furthermore, the Pearson correlation coefficient was calculated to analyze the relationship between the final grade obtained from the learning situation and the students' motivation when completing both personalized and generic exercises [1].

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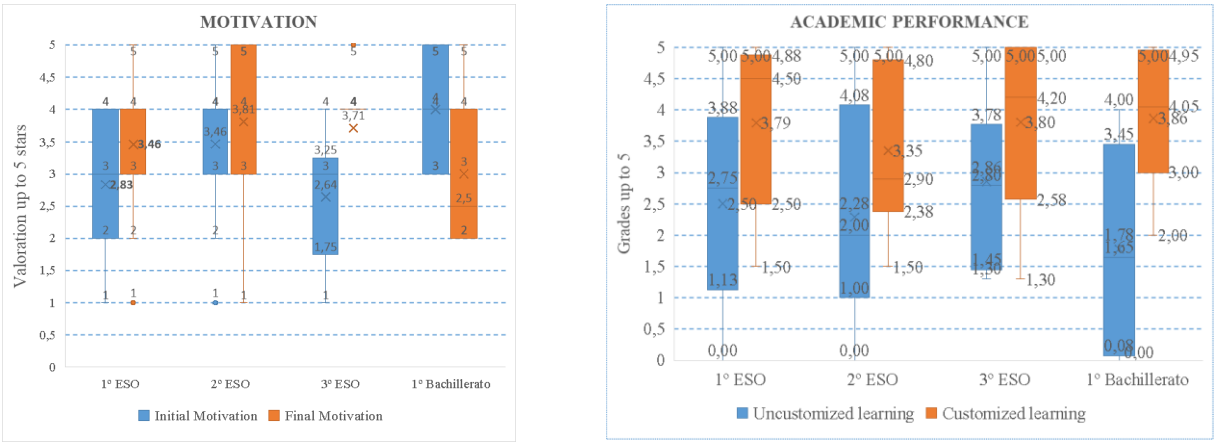
3. RESULTS AND CONCLUSIONS

3.1 Results

Figure 1 (a), presents the initial and final motivation survey results, broken down by levels. The color scheme remains consistent with the previous graph, where blue represents initial motivation and orange reflects final motivation. These ratings are measured on a 5-star scale. Figure 1 (b), shows the exam scores collected for each group, based on the course material. In all cases, the academic test was graded out of 10 points and divided into two sections: the first section consisted of two problems related to the generic course material, with a maximum of 5 points, and the second section included two problems related to the personalized material, also worth 5 points. All problems in the exams were framed in a generic format. The comparison of the scores revealed that, overall, personalized problems had a positive impact. Students achieved higher grades on the exam for those exercises they had practiced through personalized problems. The students who completed the personalized problems achieved higher scores in that section of the exam, compared to those who worked on the generic problems, thereby increasing the average score relative to the generic problems.



(a) (b)

Figure 1. Box-and-whisker plot on: (a) the motivation of all groups. (b) the academic performance of all groups.

3.2 Conclusions

The results obtained revealed that the use of this methodology, based on the creation of personalized activities, had a positive impact on students' learning experiences. Additionally, an increase in student motivation was observed compared to traditional teaching methods. It can be concluded that personalized learning contributes to enhancing student engagement with their studies, which also improves their academic performance. The close relationship between academic performance and motivation was confirmed, with evidence of positive correlations between the two. Thus, it can be concluded that interventions aimed at improving student motivation may positively influence academic performance. Although a more thorough analysis with larger populations and different cohorts is necessary, this study provides an indication of how personalized learning can enhance student motivation and, consequently, academic performance.

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Aprendizaje por proyectos en la asignatura "Responsabilidad Social – Empresa Sostenible"

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Keywords: habilidades blandas, aprendizaje por proyectos, gestión de empresas, enseñanza-aprendizaje de la RSE, máster de gestión de empresas.

ABSTRACT EXTENDIDO

1. INTRODUCCIÓN

En el ámbito de la gestión empresarial, cada vez es más frecuente que se demanden personas que posean habilidades blandas o interpersonales tales como la capacidad de negociación, el liderazgo, la resiliencia, etc. Atendiendo a ello, el propósito de este trabajo fue estudiar si la inclusión de herramientas en la docencia relacionada con la gestión de empresas permitiría al estudiantado desarrollar dichas habilidades y mejorar su empleabilidad futura. En este estudio, la herramienta propuesta fue el aprendizaje por proyectos, el cual se aplicó a un grupo de estudiantes de la asignatura "Responsabilidad Social – Empresa Sostenible" del Máster Universitario en Dirección de Empresas y Recursos Humanos ofrecido por la Universidad de Las Palmas de Gran Canaria (España).

A través de metodologías como el aprendizaje por proyectos, se buscó que la docencia adquiriera un enfoque práctico, ya que según Farrow y otros [1], este se basa en la resolución de problemas reales como mecanismo de aprendizaje. El aprendizaje por proyectos fomenta el desarrollo del pensamiento crítico, la aplicación de habilidades, la colaboración para resolver problemas o la comunicación efectiva [2]. Además, esta metodología en particular hace hincapié en la conexión entre el aprendizaje y la vida del estudiantado, lo que unido a la resolución de problemas reales genera un aprendizaje más significativo [3].

Cabe destacar que el aprendizaje por proyectos es cada vez más popular [4], aunque su implementación en el aula presenta desafíos al no ser siempre la elección más idónea [5]. Además, existen evidencias que demuestran una relación clara entre esta metodología de aprendizaje y el desarrollo de habilidades blandas [6-8].

Para responder a la pregunta planteada en este trabajo, se desarrolló un conjunto de actividades presenciales en el marco de la asignatura "Responsabilidad Social – Empresa Sostenible", con el propósito de que para que el estudiantado obtuviera los conocimientos y competencias asociadas al proyecto docente, así como habilidades blandas necesarias en la práctica empresarial, como, por ejemplo, capacidad de liderazgo, comunicación, etc.

2. METODOLOGÍA

La metodología seguida en este trabajo ha sido mixta. Por un lado, se ha realizado un análisis cuantitativo a partir de la información recabada de entrevistas entre los profesores de la asignatura y el estudiantado, así como de la puesta en común de los resultados obtenidos durante el curso por parte del equipo docente. Por otro lado, se ha realizado un análisis cuantitativo basado en un cuestionario anónimo dirigido al estudiantado. Todas las preguntas de dicho cuestionario estaban diseñadas como escalas Likert de 7 puntos, donde 1 significaba estar totalmente en desacuerdo con las diferentes afirmaciones planteadas, y 7 significaba estar totalmente de acuerdo. El número de cuestionarios recibidos fue de 16, lo que implica aproximadamente una tasa de respuesta del 94%, teniendo en cuenta el total de estudiantes matriculados en la asignatura. Estos 16 estudiantes asistían con regularidad a las clases presenciales.

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3. RESULTADOS Y CONCLUSIONES

Respecto al análisis cualitativo, los resultados obtenidos muestran que la aplicación del aprendizaje por proyectos fue exitosa. Aunque el estudiantado inicialmente no confiaba en la metodología, posteriormente aseveraron que les resultó útil no solo para adquirir las competencias propias de la asignatura, sino también para obtener habilidades blandas que podrían aplicar en un entorno laboral real, como por ejemplo la gestión de grupos y/o equipos de trabajo, el aprendizaje autónomo, etc. Es importante destacar que el uso de este tipo de herramientas provocó de forma general un aumento de la motivación entre el estudiantado, registrándose niveles muy bajos de absentismo.

En cuanto al análisis cuantitativo, se observa que el estudiantado respondió muy positivamente a todas las preguntas planteadas en el cuestionario, recibiendo una media de puntuación de 6 puntos sobre 7, o incluso más. Estos resultados evidencian la satisfacción del estudiantado con el aprendizaje por proyectos, así como con su capacidad para entrenar las habilidades blandas y para genera un entorno de enseñanza-aprendizaje motivador.

Estos resultados están en consonancia con los obtenidos en otros como los de Villanueva Morales y otros [9] y Rico Jiménez y otros [10].

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Fomento de la divulgación científica en ciencias marinas a través de la gamificación en centros de educación secundaria

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Palabras clave: autoaprendizaje, motivación, metodologías activas, aprendizaje-servicio, divulgación científica, gamificación

RESUMEN EXTENDIDO

En el marco de la innovación educativa y con el objetivo de acercar las ciencias marinas a estudiantes de enseñanza secundaria, se ha desarrollado una iniciativa basada en el aprendizaje-servicio y la gamificación. Este proyecto fue liderado por estudiantes de grado, máster y doctorado de la Facultad de Ciencias del Mar de la Universidad de Las Palmas de Gran Canaria (ULPGC), con el apoyo del profesorado, y tuvo como propósito fomentar vocaciones científicas, aumentar la conciencia sobre problemas ambientales, y establecer un vínculo entre la universidad y la sociedad. La actividad se organizó en torno a charlas divulgativas y la adaptación del "Concurso de los Océanos", inicialmente diseñado para estudiantes universitarios [1], al contexto de la educación secundaria y puntualmente también a primaria.

El proyecto tuvo un triple objetivo. En primer lugar, que los estudiantes universitarios se convirtieran en protagonistas de la divulgación de temas marinos fuera del ámbito académico, desarrollando competencias en comunicación, liderazgo y síntesis de información. En segundo lugar, dar a conocer las ciencias marinas a las futuras generaciones, incentivando su interés por esta disciplina. Finalmente, se buscó promover la conciencia sobre las problemáticas ambientales que afectan a Canarias, especialmente aquellas relacionadas con el océano.

La metodología utilizada fue de tipo de Aprendizaje-Servicio, la cual ha cobrado fuerza en todos los niveles educativos, incluyendo la educación superior, para transmitir conocimiento a la sociedad [2]. El formato escogido fue una combinación de charlas divulgativas y un enfoque de gamificación. Diversos estudios han demostrado que la gamificación en equipo fomenta nuevas formas de motivar al alumnado, facilitando el proceso de adquisición de conocimientos [3] y proporcionando una toma de conciencia de su responsabilidad con el grupo [4].

Las actividades se llevaron a cabo en seis institutos de educación secundaria en Gran Canaria y un centro de educación primaria, con un total de 221 estudiantes participantes. En cada visita, los estudiantes universitarios impartieron charlas sobre temas como el cambio climático, la contaminación marina, la telemetría animal y la oceanografía polar, utilizando un lenguaje accesible y adaptado. A continuación, se organizó el “Concurso de los Océanos”, adaptado al formato papel y diseñado para promover la participación activa de los estudiantes mediante un proceso competitivo en equipo. La gamificación se utilizó como un medio para facilitar el aprendizaje y fomentar el interés de los estudiantes.

La actividad se estructuró en tres fases: (1) una breve introducción sobre el Grado en Ciencias del Mar y sus salidas profesionales, (2) charlas temáticas sobre las investigaciones en ciencias marinas, y (3) la realización del concurso, donde los estudiantes se organizaron en equipos y respondieron preguntas sobre los temas tratados en las charlas. Al finalizar, se realizó un debate sobre las respuestas correctas y se entregaron obsequios para promover el consumo responsable.

Los resultados fueron muy positivos, destacando el alto nivel de interés de los estudiantes de secundaria en las ciencias marinas. Según las encuestas de satisfacción realizadas al finalizar la actividad, un 97% de los estudiantes consideraron el concurso interesante, y más del 50% mostró interés en continuar aprendiendo sobre temas relacionados con el mar. Además, un 85% de los participantes ya conocía la Facultad de Ciencias del Mar, lo que indica una buena difusión previa

El presente texto nace en el marco del proyecto del grupo de Innovación Educativa en Ciencias Marinas (GIEMAR) “Mejora del autoaprendizaje a través de la motivación del alumnado. Proyección hacia potenciales futuros estudiantes (PIE 2023-66)”.

de los estudios en este ámbito. Sin embargo, se identificó un desconocimiento del carácter interdisciplinario de las ciencias marinas, lo que representa una oportunidad para futuros proyectos de divulgación.

Los estudiantes universitarios involucrados en la actividad destacaron que la experiencia les permitió mejorar sus habilidades comunicativas y desarrollar un mayor sentido de responsabilidad social. Asimismo, la actividad promovió un puente efectivo entre la universidad y la sociedad, acercando temas científicos a estudiantes y docentes de secundaria, quienes expresaron un alto interés en repetir la actividad en años posteriores.

Esta experiencia piloto ha demostrado ser eficaz tanto para los estudiantes universitarios como para los de secundaria. Se logró despertar el interés por las ciencias marinas, y se fortaleció la implicación de los universitarios en actividades de divulgación. El uso de metodologías activas como el aprendizaje-servicio y la gamificación resultó ser una herramienta eficaz para fomentar la participación y el autoaprendizaje. De cara al futuro, se plantea mejorar la metodología, ajustar el nivel de las preguntas, y aumentar el alcance del proyecto, extendiéndolo a más centros educativos. La sostenibilidad de la iniciativa está garantizada por su flexibilidad y capacidad de adaptación a distintos contextos.

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