8th edition

EADTU

2024 Envisioning Report

exploring **new modes of teaching & learning** for empowering universities

---

Skills Acquisition
MOOCs
Learning Analytics

Immersive learning
Sustainability
Open Pedagogy

OER
Student Engagement
Remote laboratories

Co-funded by
the European Union

Editing, logistics and lay-out
George Ubachs and Stefan Meuleman
European Association of Distance Teaching Universities (EADTU)

Published by
European Association of Distance Teaching Universities, The Netherlands
Parkweg 27, 6212 XN Maastricht.

Suggested citation
EADTU. (2024, June) The Envisioning Report for Empowering Universities. (nr. 8). DOI: 10.5281/zenodo.11653241

Contents

Foreword

We herewith present to you the eight edition of the EMPOWER Envisioning report.

The report is set up by the expert pools of the Empower programme (empower.eadtu.eu) established by EADTU to cover the latest trends and developments in new modes of teaching. Most and foremost not by copying on-campus education, but by using new modes of teaching and enhancing education by

- building on expertise and experience
- methodologically designed education
- well-considered digital didactics (research based)
- interaction, debate and dialogue, done synchronously and asynchronously
- activating education and engaging students

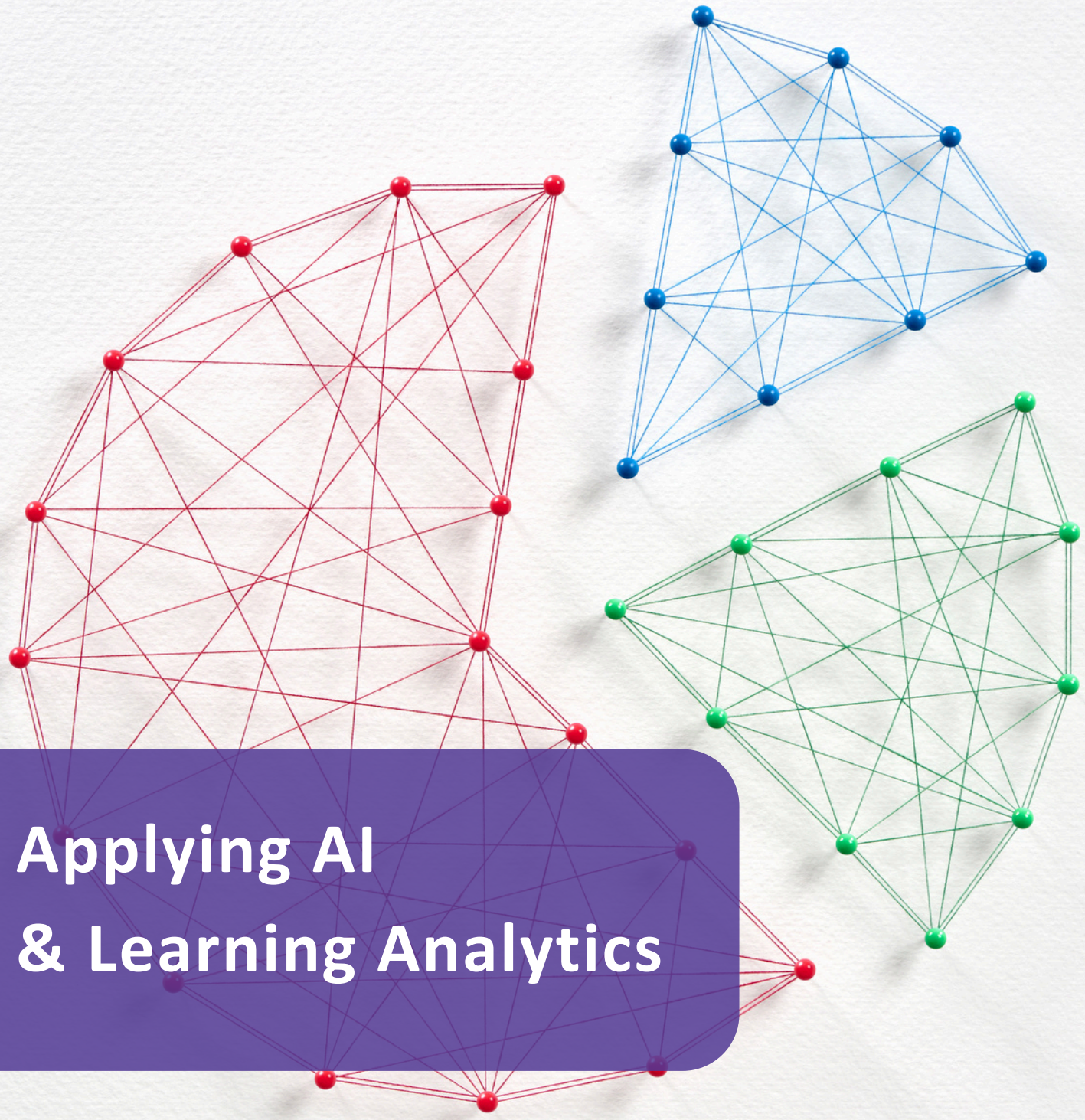
With the EMPOWER Envisioning report we aim to inspire fellow experts in innovating education by examples from practice. New modes of teaching and learning create new opportunities to enhance the quality of learning experiences on campus programmes, reaching out to new target groups off campus and offering freely accessible online courses.

They enhance the quality, visibility and reputation of the institution. They all work in all relevant areas for the development of new modes of teaching and learning. EMPOWER is further supporting individual universities by on-site expert seminars with free independent advice, onsite and online seminars, guidance for university leaders, expert panels for targeted reviews and, support for whole of institution initiatives.

In this 8th edition we cover initiatives related to: **Applying AI and Learning Analytics**, **Enhancing Engagement and Support**, **Optimizing cross-institutional Studies** and **Innovating Skills and Competencies.**

We believe this 2024 edition will inspire many to further innovate in education and foster cooperation and sharing of expertise among fellow innovators.

George Ubachs
Managing Director EADTU



Applying AI & Learning Analytics

Artificial Intelligence in Learning Organisations: Reshaping Roles and Pedagogical Processes

José Bidarra[1] and Cláudia Neves[1]

[1] LE@D, Universidade Aberta

Abstract

Recent advances in Artificial Inteligence (AI) enable organisations to support particular training and learning strategies, empowering people to advance their careers, enabling data-driven decision-making, and assuring that learning is a continuous and interesting process. According to current research, AI is a great tool for learning in organisations because it makes instructional materials easier to prepare and supports students' growth in a variety of ways. However, it appears that a particular approach to AI pedagogy is required, one that emphasises the cognitive processes rather than the reproduction of content. AI technology will become even more important in determining how learning and development are conducted in the future.

Keywords: *AI in Education, Pedagogy, Learning Organisations*

Introduction

This account of previous research aims to address this general question: How do Artificial Intelligence (AI) applications change roles and pedagogical processes in organisations? It seeks to provide a brief discussion of the current AI transformation in terms of pedagogical and technological applications for learning.

The science and practice of learning have changed over the years in the field of training and development. The field's evolution and increasing significance are reflected in the research focus on training and development in organisations. Being dynamic, learning organisations place a high priority on ongoing learning, growth, and adaptation as part of their basic principles. Although the idea of a learning organisation has many advantages, it is not without difficulties. There are several challenges that organisations must overcome in their quest to become learning organisations. For instance: cultural resistance, learning overload, lack of engagement, resistance to change, and insufficient and inadequate learning infrastructures.

Artificial intelligence (AI) has become a disruptive force in organisational learning, changing how people access, interact with, and gain from learning materials. The integration of AI technologies into learning organisations presents a plethora of opportunities and challenges due to the multifaceted impact of AI on learning, which extends to both formal and informal settings.

One of the opportunities relates to the significance of customised learning environments and AI's capacity to design unique learning trajectories for each person, boosting engagement and memory retention. In their 2014 study, Baker & Siemens investigate how students can benefit from personalised learning experiences through the use of data mining and learning analytics, which are fueled by AI. Their research offers insightful information about how artificial intelligence can be used to customize learning opportunities to meet the needs of specific students. They highlight how artificial intelligence (AI) can make learning experiences more efficient and interesting by analysing data, modifying content, and offering real-time feedback.

Within the framework of Higher Education, where most research takes place, two primary problems need to be addressed: (1) Like other digital technologies, current AI tools are primarily perceived and utilized as tools, hiding their fundamental role as a component of human perception and experience (Hillman & Säljö, 2016; Malafouris, 2013; Säljö, 2019); and (2) prevalent pedagogical approaches indicate a uniformising nature, typically focused on the teacher, implying a narrow perspective of instruction that ignores other forms of learning located beyond these confining boundaries (Pargman, 2019; Selwyn et al., 2020).

The impact of AI

The personalisation of learning (Baker & Siemens, 2014), accessibility of education (Holmes, Bialik & Fadel, 2023), enhancement of skill assessment (Meyer, 2022), and support of data-driven decision-making (Siegel, 2013) are just a few examples of the enormous potential of artificial intelligence. These advancements offer educators and organisational leaders a strong platform to leverage AI's transformative potential in learning environments as it continues to progress.

Advanced algorithms enable AI systems to examine a person's performance, preferences, and learning history to provide personalised learning routes. People will be more engaged and retain more information if they receive training and content that is specifically tailored to their needs, thanks to this personalisation.

However, regardless of the intended effects, technology frequently amplifies effects on education (and learning), as noted by Roschelle, Lester, and Fusco (2020). It is critical to reconsider how human intelligence—that is, educators, leaders, decision-makers, and learners—fits into the learning processes while using AI tools to be ready for unforeseen consequences. For example, trainers and educators must modify their pedagogical approaches to accommodate AI technologies, with focus on the cognitive processes rather than the reproduction of content. However, they should also investigate the transformative potential of AI in education as a means of revolutionising learning procedures, rendering them more effective, customised, and influential for individuals and institutions alike.

A vast range of use cases for generative AI in organisations, including software development and testing, memos, essays, business letters, and contracts, have been demonstrated by ChatGPT's recent global and extensive transformation (Reed, 2022, Tung; 2023). Nonetheless, it has also sparked a renewed discussion about more conventional human endeavours by bringing up a number of issues about the challenge of differentiating between human and AI authorship in academic circles (Else, 2023; Stokel-Walker, 2023). These issues come from the possibility that ChatGPT and other similar technologies, like Bard, Gemini and Claude, could have both beneficial and detrimental effects on the society in which we live. For this reason, care must be taken while using the technology.

Learning with AI

It is imperative that students comprehend that they are essential to the advancement and utilisation of artificial intelligence in multiple capacities. Through their interactions with digital learning materials, online courses, and educational platforms, learners generate data that is utilised by AI. The quality of AI-driven educational products can be enhanced and AI algorithms trained with the help of this data, which includes performance and user behaviour data. So, learners can impact the continuous development of AI systems in education and offer insights about what works and what doesn't. They can subsequently collaborate with instructors and content producers to design learning resources that are enhanced by AI.

But it's crucial to recognise that as AI continues to change education and training, students must learn how to think critically and become aware of the biases, limitations, and ethical issues surrounding AI. With this knowledge, learners can utilise AI technologies responsibly and participate intelligently in conversations regarding the technology during the learning process (Gašević, Siemens, & Sadiq, 2023).

AI has the ability to improve and optimise pedagogical processes by providing new tools and capabilities that can be advantageous to all the stakeholders involved: leaders, educators, instructors, trainees, and students in general. Therefore, the connection between pedagogy and AI in this context must be one of collaboration and augmentation. However, ethical, privacy, and equality issues must be carefully considered in order to apply AI in a responsible and successful manner. Regulation and careful thought must be given to the ethical and sociological issues raised by the use of AI in education and training. To fully realise the promise of these revolutionary technologies, leaders and legislators play a key role in assuring the ethical integration of AI in learning organisations.

Conclusion

Current research demonstrates that AI is a great tool for learning in organisations since it facilitates the creation of didactic materials and advances training in a variety of ways. The use of AI cannot be reduced to a mere form of "cheating", when it comes to instruction and learning, because it has very positive outcomes, for instance, constructing summaries, providing examples, designing simulations, and fostering practice. Furthermore, it turns out that in order to function in the workplace, and as productive members of our society, everyone needs to develop AI literacy. However, this should always be pursued with a critical eye and following a humanistic perspective.

The autonomy and capacity for reasoned decision-making may be impacted by the improper application of AI in learning organisations. So, the application of AI must be balanced with the demands of successful learning and critical thinking. To that end, we provide the following six recommendations:

	Recommendations	Stakeholders
1	Highlight the valued role of human instructors	Leaders, Instructors
2	Provide technical and pedagogical support to instructors	Leaders, IT Staff, Instructors
3	Associate AI tools with an accepted pedagogical model	Instructors, Learners
4	Design and deliver instruction using ethical AI principles	Instructors, Learners
5	Address issues of safety and privacy of AI use	Leaders, IT Staff, Instructors
6	Notify users of specific guidelines and precautions	Leaders, IT Staff

Lastly, in contradiction with many unenthusiastic views, we believe that AI plays a revolutionary role in learning within organisations. It guarantees that learning is a continuous, interesting activity, gives people the ability to advance their abilities, and enables organisations to make decisions based on facts. Thus, AI technology is poised to become increasingly more influential in the future of training and development within organisations.

References

Baker, R., & Siemens, G. (2014). *Educational data mining and learning analytics*. Cambridge University Press. https://doi.org/10.1017/CBO9781139519526.016.

Else, H. (2023). Abstracts written by ChatGPT fool scientists, 423-423, *Nature*, 613 (7944). https://doi.org/10.1038/d41586-023-00056-7.

Gašević, D., Siemens, G., & Sadiq, S. (2023). Empowering learners for the age of artificial intelligence. *Computers and Education: Artificial Intelligence*, Volume 4, 2023, 100130, ISSN 2666-920X, https://doi.org/10.1016/j.caeai.2023.100130.

Hillman, T., & Säljö, R. (2016). Learning, knowing and opportunities for participation: technologies and communicative practices. *Learning, Media and Technology*, 41(2), 306–309. https://doi.org/10.1080/17439884.2016.1167080

Holmes, W., Bialik, M., & Fadel, C. (2023) Artificial intelligence in education. In *Data ethics: building trust: how digital technologies can serve humanity*. (pp. 621-653). Globethics Publications.

Malafouris, L. (2013). *How Things Shape the Mind A Theory of Material Engagement* (1st ed.). The MIT Press Cambridge, Massachusetts.

Mayer, R. (2022). Instructional media and instructional methods in digital language learning: Are we asking the right questions? *Bilingualism: Language and Cognition*, 25(3), 396-397. https://doi.org/10.1017/S1366728921000559.

Pargman, C. T. (2019). Unpacking Emergent teaching Practices with Digital Technology. In C. T. Pargman & I. Jahnke (Eds.), *Emergent Practices and Material Conditions in Learning and Teaching with Technologies* (1st ed., pp. 33–51). Springer Netherlands.

Reed, L. (2022). *ChatGPT for Automated Testing: From conversation to code Sauce Labs*. https://saucelabs.com/blog/chatgpt-automated-testing-conversation-to-code

Roschelle, J., Lester, J., & Fusco, J. (Eds.) (2020). AI and the future of learning: Expert panel report [Report]. *Digital Promise*. https://circls.org/reports/ai-report.

Säljö, R. (2019). Materiality, Learning, and Cognitive Practices: Artifacts as Instruments of Thinking. In C. T. Pargman & I. Jahnke (Eds.), *Emergent Practices and Material Conditions in Learning and Teaching with Technologies* (pp. 21–32). Netherlands: Springer.

Selwyn, N. (2020). Approches critiques des technologies en éducation: un aperçu. *Formation et Profession*, 27(3), 6. https://doi.org/10.18162/fp.2019.579.

Siegel, E. (2013). *Predictive Analytics: The Power to Predict Who Will Click, Buy, Lie or Die*. John Wiley & Sons, Inc. ISBN: 978-1-118-35685-2.

Stokel-Walker, C.J.N. (2023). ChatGPT listed as author on research papers: many scientists disapprove. *Nature*, 613 (2023), pp. 620-621. https://doi.org/10.1038/d41586-023-00107-z.

Tung, L. (2023). ChatGPT can write code. Now researchers say it's good at fixing bugs, too. *ZDNet*. https://www.zdnet.com/article/chatgpt-can-write-code-now-researchers-say-its-good-at-fixing-bugs-too/

Enhancing Academic Success: Collaborative Development of an Adaptive Intelligent Tutoring System

Theodora Kouvara[1], Maria Aristeidou[2], Christothea Herodotou[2] and Vassilios S. Verykios[1]

[1] School of Science and Technology, Hellenic Open University, Patras, Greece
[2] Institute of Educational Technology, The Open University, United Kingdom

Abstract

In this report, we present the collaborative efforts between the Open University (OU) in the UK and Hellenic Open University (HOU) in Greece, aimed at designing a predictive learning analytics dashboard with recommendation services for online and distance students. This initiative seeks to offer students personalized feedback throughout their academic journey. Our immediate objective is to brainstorm innovative ideas and develop new methodologies that advance beyond the current state-of-the-art recommendation techniques, including content-based, collaborative filtering and hybrid approaches. We aim to achieve this by integrating as much relevant data as possible into the process. In the long term, our collaborative goal is to create a sophisticated system that meets the needs of both tutors and students at our universities. This system will process data on student performance and behavior in real-time and will be integrated into existing Learning Management Systems to facilitate an Adaptive Intelligent Tutoring System.

Keywords: *recommendation systems, collaborative filtering, personalized learning, distance education, intelligent and tutoring systems*

Introduction

In today's digital education landscape, personalized learning in distance education is becoming increasingly essential. At The Open University (OU) in the United Kingdom and Hellenic Open University (HOU) in Greece, we utilize learning analytics to customize feedback and enhance student engagement and success. The OU's Early Alert Indicators (EAI) dashboard is a prime example of this approach, featuring advanced predictive analytics capabilities. This system uses a machine learning model to provide weekly assignment success predictions, represented through a traffic light color code: green for likely success, amber for cases that are borderline, and red for potential failure. It also employs a regression-based model to forecast long-term academic success and to visualize trends in student engagement, thereby supporting effective and targeted interventions (Herodotou et al., 2023).

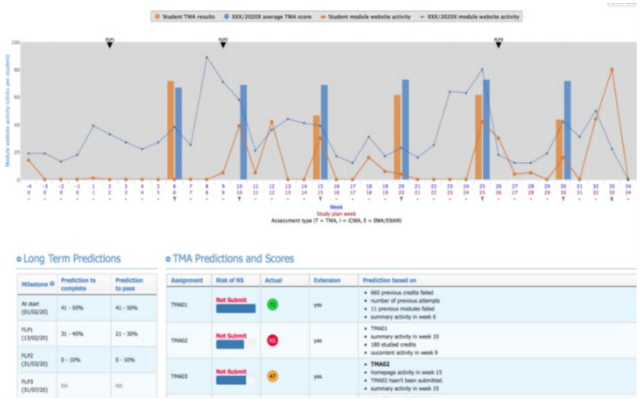


Figure 1: 'The EAI dashboard displays VLE engagement, assignment performance, and predictions for individual students'

At HOU, the Big Data Analytics and Anonymization Lab (BATLAB) utilizes learning analytics to foster inclusivity in

distance education. Through sophisticated data analysis, we tailor educational strategies, specializing in Social Network Analysis to enhance student interactions (Tsoni et al., 2024).

Building on these initiatives, OU and HOU have embarked on a collaborative project to further refine educational methodologies. We are developing advanced algorithms that go beyond traditional recommendation techniques like content-based and collaborative filtering. These new algorithms will integrate behavioral analytics, learning contexts, and individual learning styles to predict student needs more accurately. For our long-term objectives, we plan to integrate advanced predictive analytics and recommendation technologies into the Learning Management Systems at both universities, leading to the development of an Adaptive Intelligent Tutoring System (AITS).

Future Methodology

Data Processing

In the initial phase of our methodology, we will gather extensive datasets and conduct a detailed preprocessing stage to ensure data integrity and usability. We will focus on eliminating irrelevant interactions and anonymizing personal information by replacing names and emails with unique identifiers, ensuring compliance with privacy laws and refining the dataset for deeper educational analysis. This structured approach lays the groundwork for developing our predictive analytics capabilities.

Transition Analysis

Following the initial data preprocessing, we will continue with Transition Analysis to delve deeper into how students interact with Moodle's educational resources. In this phase, each educational resource within Moodle is depicted as a node within a network graph, mimicking hyperlink navigation on websites. Student movements between these nodes are rigorously monitored and analyzed.

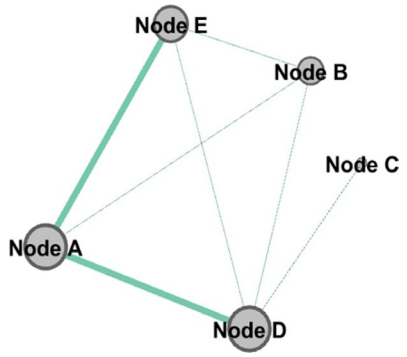


Figure 2: 'A sample undirected one-mode network of five nodes'

We will employ transition probability matrices for each student to effectively track and discern patterns in how they navigate from one resource to another. This detailed oversight provides a nuanced understanding of both individual and collective student navigation behaviors, which is instrumental in pinpointing vital educational resources and identifying potential learning bottlenecks.

To enhance our analysis, we will adapt the PageRank algorithm to our educational framework, originally designed to rank web pages by assessing the quantity and quality of links to each page under the assumption that more significant pages are likely to receive more links from other websites (Brin & Page, 1998). Our modification of the algorithm will simulate a student's navigation through these resources. With a defined probability (typically around 0.85), a student will follow a 'link' from one resource to another based on existing transitions, and with the remaining probability, jump to a random resource. This adaptation not only allows us to track but also to predict student behavior within the virtual learning environment, thereby facilitating more targeted educational interventions.

Eigenvector Analysis for Deeper Insights

After calculating the PageRank, we will further examine the eigenvectors of the transition probability matrices. This analysis aids in identifying key resources that significantly impact student pathways and engagement, thus highlighting central nodes within the educational network (Paxinou et al., 2023a; Tsoni et al., 2022). Eigenvector centrality measures the influence of a node within the network, indicating how pivotal a resource is within the context of student interactions and engagement. This metric assumes that a node's influence is enhanced if it is linked to other highly influential nodes, providing a richer understanding of the network's structure and the dynamics within.

In the educational context, a resource with high eigenvector centrality becomes a prime candidate for further development or highlighted support because it significantly shapes the learning journey. This might influence decisions such as where to add supplementary materials, where to focus discussions, or even where to introduce new assessment methods to capitalize on the engagement patterns observed (Paxinou et al., 2023b; Tsoni et al., 2021).

Implementing Collaborative Filtering Algorithms

In the pursuit of refining our educational methodologies, our analysis utilizing the PageRank and eigenvector centrality will have successfully pinpointed crucial educational resources and discernible navigation patterns among students. Building upon this foundation, we will set to incorporate Collaborative Filtering Algorithms (CFA) to further sophisticate our

approach. This advancement leverages aggregated data across all students, enhancing our ability to detect common patterns and relationships in resource usage, which is pivotal for generating personalized educational recommendations (Murad et al., 2018).

In a scenario with a cohort of students in a specific course, our aim is to enhance their learning experience by guiding them toward untapped resources that could benefit them. We aggregate transition data from all students to capture comprehensive resource access patterns. Applying collaborative filtering algorithms enables us to discern intricate relationships and tailor recommendations effectively. Focusing on a student, "Student D," we calculate similarity scores with other students to identify nearest neighbors with similar resource access patterns. We then analyze unexplored resources accessed by these neighbors to compile a curated list aligning with Student D's learning behaviors. This list, sorted by both resource frequency and significance, aims to enhance educational engagement and efficacy for Student D and all students.

To expand the scope of our predictive analytics and recommendation technologies, we will go beyond using just Collaborative Filtering Algorithms. We plan to incorporate content-based filtering and hybrid methods that meld both techniques. Content-based filtering will allow us to recommend educational resources based on their content similarity to materials a student has previously engaged with, offering more tailored recommendations to match individual learning preferences. Additionally, our hybrid approach will combine the detailed contextual insights of content-based filtering with the powerful pattern recognition of collaborative filtering, enhancing the effectiveness and precision of our recommendations.

System Integration into EAI Dashboard

Through the incorporation of adaptive predictive models, our EAI dashboard will expand its functionality to not only predict short-term academic outcomes but also to adapt dynamically to students' current interactions within Moodle.

The dashboard will implement a continuous learning feedback loop, where it learns from the students' interactions with the recommended resources. This process enables the dashboard to track which recommendations are most effective in improving academic outcomes such as assignment completion rates and consistent engagement with course materials. Using regression analysis, the system will continuously update its predictions and refine the transition probability matrix based on the latest student data. This ongoing refinement helps maintain the relevance and accuracy of the predictive models as student behaviors and course dynamics evolve.

The system will monitor changes in student engagement patterns resulting from the recommended resources and analyze subsequent performance in TMAs or other assessments. This correlation analysis helps the system fine-tune its predictive algorithms, thereby enhancing the accuracy and effectiveness of its forecasts.

We will encourage students to provide direct feedback on the usefulness of the resources, suggested by the dashboard. This feedback will be integral to further informing the system's learning algorithms and recommendation processes, ensuring that the resources provided are genuinely beneficial and meet the students' needs. As more data on student performance and resource engagement is collected, the EAI dashboard will iteratively update, ensuring that the recommendations remain pertinent and actionable. This iterative process is crucial for the system to adapt to changes in course content, teaching methods, and student interaction patterns.

Conclusion

This envisioning report has charted a bold path for the future of distance education at the OU and HOU, showcasing our planned advancements in predictive analytics and adaptive learning technologies. As we move forward, the Early Alert Indicators dashboard and the innovative analyses conducted by the BATLAB, will play crucial roles in not only augmenting student engagement and achievement but also in enhancing inclusivity and personalized educational experiences.

By setting new benchmarks for what is achievable in distance education, our initiatives will not merely respond to student needs but will anticipate and act upon them, thereby molding a more effective and responsive educational framework.

References

Brin, S., & Page, L. (1998). The anatomy of a large-scale hypertextual web search engine. *Computer Networks and ISDN Systems, 30*(1-7), pp. 107-117. https://storage.googleapis.com/gweb-research2023-media/pubtools/pdf/334.pdf

Herodotou, C., Maguire, C., Hlosta, M., & Mulholland, P. (2023). Predictive Learning Analytics and University Teachers: Usage and perceptions three years post implementation. *In the proceedings of the 13th International Learning Analytics and Knowledge Conference* (*LAK23) (*pp. 68-78). DOI:10.1145/3576050.3576061

Murad, D. F., Heryadi, Y., Wijanarko, B. D., Isa, S. M., & Budiharto, W. (2018). Recommendation system for smart

LMS using machine learning: a literature review. *In the proceedings of the 2018 international conference on computing, engineering, and design (ICCED)* (pp. 113-118). IEEE. DOI: 10.1109/ICCED.2018.00031

Paxinou, E., Manousou, E., Feretzakis, G., & Verykios, S. V. (2023a). Community Detection and Social Presence in Students' Discussion Fora. *Intelligent Decision Technologies*, *17*, pp. 879–891. DOI 10.3233/IDT-230315

Paxinou, E., Manousou, E., Verykios, V. S., & Kalles, D. (2023b). Centrality Metrics from Students' Discussion Fora at Distance Education. *In the Proceedings of the 14th International Conference on Information, Intelligence, Systems & Applications* (IISA), pp. 1-6. IEEE. DOI: 10.1109/IISA59645.2023.10345914

Tsoni, R., Garani, G., & Verykios, V. S. (2023). Incorporating Data Warehouses into Data Pipelines for Deploying Learning Analytics Dashboards. *In the Proceedings of the 13th International Conference on Information, Intelligence, Systems & Applications (IISA*). IEEE. DOI: 10.1109/IISA59645.2023.10345957

Tsoni, R., Panagiotakopoulos, C. T., & Verykios, V. S. (2022). Revealing latent traits in the social behavior of distance learning students. *Education and Information Technologies, 27*(3), pp. 3529-3565. DOI: 10.1007/s10639-021-10742-6

Tsoni, R., Paxinou, E., Gkoulalas-Divanis, A., Karapiperis, D., Kalles, D., & Verykios, V. S. (2024). Exploiting Properties of Student Networks to Enhance Learning in Distance Education. *Information, 15*(4), 234. DOI: 10.3390/info15040234

Tsoni, R., Sakkopoulos, E., Panagiotakopoulos, C. T., & Verykios, V. S. (2021). On the equivalence between bimodal and unimodal students' collaboration networks in Distance Learning. *Intelligent Decision Technologies*, *15*(2), pp. 305-319. DOI: 10.3233/IDT-200137

MOOC “AI Words”: Introduction to the Vocabulary of Artificial Intelligence – Return on the Learning Analysis Based on the Learning Experience in the MOOC

Valéry Psyché [1], Guy Carlos Tamkodjou Tchio [2], and Geneviève Dermers[1]

[1] Université TÉLUQ
[2] Université du Québec à Montréal

Abstract

Montreal has become a hub for artificial intelligence (AI) research, attracting highly qualified international scientists and professionals. However, these newcomers, most of whom are non-French speakers, tend to use a computer jargon rich in neologisms borrowed from English, even when working in French. Since the 2010s, with the advent of data science and the growing importance of deep learning, this phenomenon is likely to increase considerably. This situation is worrying for organizations dedicated to the protection of the French language and the French-speaking business world, where the issue of language preservation is crucial. Our project was therefore aimed primarily at the group of English-speaking or allophone workers in the AI sector, with a keen interest in measuring their motivation to take this online course, in order to adjust the pedagogical design of the course.

This paper introduces the Massive Open Online Courses (MOOC) "Mots d’IA” (AI Words) for learning important AI terms and concepts in French, discussing its design, learning experience and learning analysis results. In particular, in order to measure learner's learning experience throughout the MOOC, we implemented a learning analytics approach during its design, including educational traces collection tools. This paper present our approach and the lessons learned from the learning analysis, as well as the long-term techno-pedagogical innovations that resulted, in particular to maintain learner motivation in the MOOC.

Keywords: *Artificial Intelligence, MOOC, Online Learning, Learning Experience*

Introduction

MOOCs have significantly transformed education by providing accessible distance learning programs for everyone. Emerging around the 2010s (Cisel, et al., 2012), MOOCs have become increasingly important in university education. The pandemic has stimulated their production (Shah, 2020) and learners' enthusiasm to follow them, with benefits such as skill development, learning flexibility, the collection of learning traces, and increased university visibility (Dubé, Turcotte & Vallières, 2013; Karsenti, 2013; Gregoire, 2016). Learners can therefore follow courses remotely, at any time and anywhere in the world, as long as they have an Internet connection. However, despite their numerous advantages, MOOCs face the challenge of a high dropout rate, attributable to learning design, learning and personal or situational factors (Goopio & Cheung, 2021). Launched early in the pandemic, the "AI Words" MOOC introduced learners to the vocabulary of AI.

This paper introduces this MOOC, explores its design, its key components, the learning experience and the analytical tools used for learner feedback. The design and analysis tools employed generated unexpected learning data. Based on the results of the statistical analysis of the learner experience, we have formulated concrete findings and recommendations to improve the MOOC, responding to the

varied needs of learners. Among the improvements made, let's highlight the integration of a chatbot and the transformation of web-based learning content into free, open, and accessible educational resources, with the assistance of generative AI like ChatGPT.

MOOC Project and Design

This course is offered in French and aims to enhance knowledge of French terminology related to AI. The goal is to enable learners to apply this knowledge in their professional environments. Additionally, the course supports linguistic organizations that fight for the preservation of French in Quebec and other French-speaking regions.

This course is aimed at both French-speaking and non-French-speaking professionals specializing in AI in scientific and business environments, using French technical jargon rich in English neologisms. It is also open to anyone interested in this field. The course was designed by a team led by Valéry Psyché, professor in the Education Department at Université TELUQ. The team also included experts from the Montreal AI ecosystem, as well as a technopedagogical team from Université TELUQ. The course material includes audio and video clips with their transcriptions, authentic texts, graphic documents, pedagogical activities to master the vocabulary of AI, recap activities at the end of each module, a forum for learner exchanges, as well as additional and optional resources such as lexicons, glossaries, and bibliographic references to deepen the learning.

The pedagogical approach is based on the work of Olmo Cazevieille (2007) and consists in teaching specialized vocabulary through the learning of the domain to which it belongs. The progression follows steps of exploration, acquisition, deepening, broadening and reuse of vocabulary, using authentic documents. Learners ask questions, watch videos, do exercises and take an assessment test to evaluate their knowledge. The course is structured to allow an autonomous approach, adapted to the pace of each learner, with unlimited access to the training.

Exploring the MOOC

The MOOC is available online at https://clom-motsia.teluq.ca/. It is organized into 5 modules designed to introduce learners to the vocabulary of AI. Module 1 covers the general concepts of AI, module 2 focuses on symbolic AI concepts, module 3 explores connectionist AI concepts, module 4 develops AI concepts in education, and module 5 presents the pedagogical tools used.

An integrated tracking tool allows learners to follow their progress through the course, indicating which sections have already been covered and which are still to be explored, providing an overview of their progress through the program. The forum included in the course enables learners to collaborate asynchronously to deepen their understanding of domain concepts and expand their professional network, enriching their learning experience. A certificate of participation is issued at the end of the course.

Feedback Based on Learning Analytics

Despite the richness of the data obtained in the study, we will focus on certain aspects of the sociodemographic profile of the participants as well as their experience in completing the course.

The sociodemographic composition of the participants is varied. More than half of the sample are men (58%). The most represented age group is 35-54 years old, with a proportion of 47%. A significant proportion, 21%, falls within the 25-34 age range. Most people live in Quebec (60%). However, a significant proportion live outside of Canada (39%). The languages spoken reflect a multicultural society, with 29% French-speaking, 31% French-English bilinguals, and 41% multilinguals. Most participants have a high level of education, with 78% having attended university, 30% of them having achieved a master's degree. Among the academic disciplines, business administration (21%), engineering (18%), and education/human sciences (22%) are the most represented. Although most participants have limited knowledge of AI (86%), 14% have in-depth knowledge in this field.

Regarding course participation, the vast majority of respondents (98%) took the course individually. 75% of respondents with disabilities found the content accessible. Between 82% and 93% of respondents are conscientious and rigorous in completing the MOOC modules. 34% find the modules too long. Only a small fraction of respondents, between 11% and 13%, are actively engaged in forums or discussions.

Learning Engagement in the MOOC

Taking all respondents together, almost three quarters (72%) were highly motivated at the start and remained so throughout the entire MOOC. Less than one in ten (8%) experienced an increase in motivation during the course.

Module 2 generated significantly less interest among participants compared to other modules. Indeed, 20% of respondents showed a decrease in motivation during its progress, while 12%, already lacking motivation from the start, maintained this level of motivation throughout.

The study by Liu et al. (2024) highlights the significant impact of emotions on participant engagement in a MOOC. Emotions can affect motivation and academic performance. Positive emotions, such as joy, are often associated with better motivation, performance, engagement, satisfaction, and success in online learning, as emphasized by Wu & Yu (2022). On the other hand, negative emotions, such as fear, anger, or sadness, can lead to decreased motivation or disengagement, thus damaging students' learning

experience, according to Osika et al. (2022). The survey conducted among MOOC participants reveals that joy is the most frequently felt emotion, with 93% of respondents having experienced it. Other emotions are less common, with 21% of participants having felt sadness, 18% fear, and only 7% anger.

Recommendations and Outlook

To enhance participants' experience in the MOOC, several recommendations are suggested. It is advised to integrate more multimedia content, including videos and images, especially in Modules 2 and 4, to maintain learners' interest. Additionally, the inclusion of more examples and further explanations, particularly in Module 4, could enhance the understanding of concepts. Reducing the length of the content, especially in Module 2, as well as incorporating more quizzes and practical exercises, are also recommended to boost participant engagement. For Module 4, reducing the volume of readings could lighten the workload and maintain a high level of motivation among learners.

The main prospects for improvement in the next version of the MOOC focus on optimizing navigation and technological tools (forum, toolbox, downloading and printing resources), improving learning tracking with a more visible progress tool, and reorganizing the duration and length of the educational content. The research perspectives arising from the MOOC and which are currently being implemented include the integration of a reciprocal peer recommendation system for the forum in order to promote connection and interaction between learners with reciprocal interests (Miladi and al., 2023); the integration of a conversational robot in the MOOC which would act as a learning companion and which is powered by content from the MOOC in order to offer reliable answers to learners (Miladi and al., 2024). Finally, it is planned to add a layer of empathy to this robot in order to maintain the motivation of learners.

Conclusion

The "*AI Words*" MOOC successfully introduced many learners to French-language AI vocabulary. Through an accessible online format and sophisticated analytical tools, we were able to collect valuable data on the participants' learning experience. This data highlighted areas for improvement. By leveraging these findings, we were able to optimize the MOOC to make it more engaging, interactive, and tailored to the diverse needs of learners. The integration of a chatbot and the transformation of content into open educational resources assisted by AI will considerably enhance the learning experience. Beyond the immediate pedagogical benefits, this project is making a long-term contribution to strengthening the use of French in the fields of computer science and AI. By developing and disseminating appropriate French terminology, we are actively participating in curbing the anglicization of technical vocabulary and promoting the inclusion of highly qualified international scientists and professionals in French-speaking work environments.

References

Cisel, M., & Bruillard, E. (2012). Chroniques des MOOC. *STICEF*, Volume 19, pp. 1-16.

Dubé, J.-S., Turcotte, D., & Vallières, C. (2013). Face et pile l'essentiel en deux pages ; deux côtés de la médaille, Les MOOC. *Université Sherbrooke, Service de soutien à la formation, veille et gestion des connaissances.*

Goopio, J., & Cheung, C. (2020). The MOOC dropout phenomenon and retention strategies. *Journal of Teaching in Travel & Tourism*, *21*(2), 177–197. https://doi.org/10.1080/15313220.2020.1809050

Grégoire, R. (2016). Cours en ligne ouverts et massifs : État des lieux et adoption au Canada français. Guide et bilan de l'impact des cours en ligne ouverts et massifs (CLOM) au Canada Francophone. *Réseau d'enseignement francophone à distance du Canada (REFAD).* Retrieved from http://www.refad.ca

Karsenti, T. (2013). The MOOC Revolution or just a fad? *International Journal of Technologies in Higher Education, 10*(2),6–37.

Liu, Y., Ma, S., & Chen, Y. (2024). The impacts of learning motivation, emotional engagement, and psychological capital on academic performance in a blended learning university course. Frontiers in Psychology, 15.

Miladi, F., Lemire, D., & Psyché, V. (2023). Learning engagement and peer learning in MOOC: a selective systematic review. In International Conference on Intelligent Tutoring Systems (pp. 324-332). Cham: Springer Nature Switzerland.

Miladi, F., Psyché, V., & Lemire, D. (2024). Comparative Performance of GPT-4, RAG-Augmented GPT-4, and Students in MOOCs.

Olmo Cazevieille, F. (2007). Introduire le lexique spécialisé dès l'initiation en français scientifique. *Didactica*, 19, 173 185.

Osika, A., MacMahon, S., Lodge, J. M., & Carroll, A. (2022). Emotions and learning: What role do emotions play in how and why students learn?. *THE Campus*.

Shah, D. (2020). By The Numbers: MOOCs in 2020. *The Report.* Retrieved from https://www.classcentral.com/report/mooc-stats-2020/

Wu, R., & Yu, Z. (2022). Exploring the effects of achievement emotions on online learning outcomes: A systematic review. *Frontiers in Psychology,* 13. https://doi.org/10.3389/fpsyg.2022.977931

Enchancing Engagement and Support

Lab-Assist: Enhancing STEM education through online laboratories with real-time support

Dhouha Kbaier[1], Helen Lockett[2] and Karen Kear[1]

[1] School of Computing and Communications, The Open University, United Kingdom
[2] School of Engineering and Innovation, The Open University, United Kingdom

Abstract

This paper explores the innovative impact of implementing real-time support within the OpenSTEM Labs (OSL), the Open University's online laboratories. Online laboratories allow students to participate in practical work over the internet, at a time and place of their choosing and provide a rich and interactive learning environment for students engaging in practical STEM activities. However, students may encounter challenges while conducting experiments independently. The aim of the Lab-assist project was to implement real-time support mechanisms within the OSL. The short-term impact involves providing immediate assistance to students conducting remote experiments, particularly benefiting those with disabilities and additional needs. By offering tailored support, the project aims to reduce the attainment gap and enhance student engagement. In the long term, the project seeks to transform the educational experience by fostering a dynamic and responsive support ecosystem. This endeavor aligns with the broader goal of empowering students to excel in STEM studies and reach their academic goals.

Keywords: *distance learning, live support, real-time support, STEM education, online laboratories, OpenSTEM Labs, student engagement, The Open University*

Introduction

The proliferation of online learning, accelerated by factors such as the COVID-19 pandemic, has reshaped the landscape of higher education, necessitating innovative approaches to support students' academic endeavors. Central to effective online learning is the provision of timely assistance, aligning with the principles of self-regulated learning (Zimmerman & Moylan, 2009) and metacognition (Broadbent and Lodge, 2021). While traditional methods such as email and discussion boards are common avenues for seeking help (Kitsantas & Chow, 2007; Koc & Liu, 2016), they often lack synchronous support, posing challenges for students. Live chat technology emerges as a promising solution, offering real-time assistance and fostering a sense of connection between students and instructors. Studies indicate positive perceptions of live chat technology among online learners, highlighting its potential to enhance academic support mechanisms in higher education. Several studies found that instant messaging increases interactions between students and teachers in higher education (Klein et al. 2018; McInnerney & Roberts, 2004), improves the sense of connection (Luo et al. 2017; Robles et al. 2019), and enhances student satisfaction (Luo et al. 2017). Students also appreciate instant messaging's immediate and timely responses (Lauricella & Kay, 2013).

Extended OpenSTEM Labs capabilities to enhance student success: Real-time support mechanisms

The OpenSTEM Labs (OSL) at the Open University (https://www.youtube.com/watch?v=6S3JFsOAPOI&t=8s) has emerged as a key strategic asset for the STEM Faculty and University, focussed on delivering authentic, pedagogically sound, practical experiences to students in a distance learning environment (The OpenSTEM Labs | Faculty of Science, Technology, Engineering & Mathematics). However, students may encounter challenges while conducting

experiments independently, particularly those with disabilities or additional needs. To address this, the Lab-Assist project (Kbaier et al. 2023) proposes the implementation of real-time support mechanisms within the OSL.

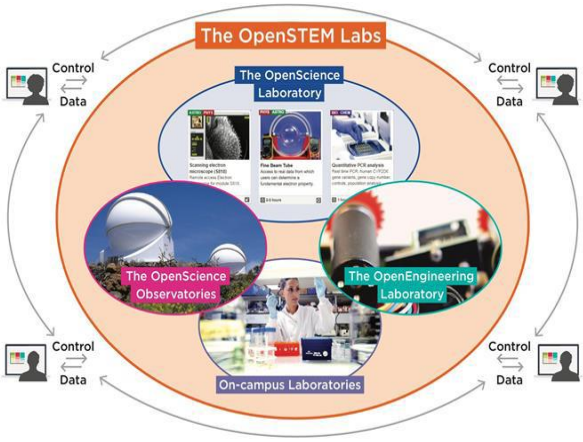


Figure 1: Current OpenSTEM Labs structure illustrating students interacting with remote instrumentation and databases through authentic interfaces, and with each other. Image Courtesy of The Open University.

Insights from module chairs

A survey was carried out with module chairs within the OSL to elucidate the perspectives and requirements regarding the implementation of real-time support mechanisms for students engaging in OSL activities. The analysis of the survey responses from module presentation chairs revealed several key findings:

- Importance of real-time support, particularly for complex activities and those using remote equipment
- Prioritization of assessed and/ or collaborative experiments
- Potential benefits for students with disabilities, anxiety or specific learning environments
- Proposed implementation modalities (live chat, video conferencing, group sessions, pop up messages, special time slots in the booking system)
- The need for improved support mechanisms

Pilot live support for mechanical engineering module (T229 Mechanical engineering: heat and flow)

The Lab-Assist project involves piloting real-time support sessions using Adobe Connect for selected OSL activities (see Figure 2). These sessions offer immediate assistance via live chat and/ or audio to students facing technical issues or challenges during experiments. The support is provided by qualified staff members, including tutors, project specialists, and lab technicians, who are trained to effectively assist students.

Two pilot trials for live support sessions were carried out in 2023 and 2024, specifically targeting technical issues encountered during experiments in a remote wind tunnel experiment. These yielded limited participation despite proactive advertising and accessibility measures, leading to challenges in collecting comprehensive feedback. However, tutors reported positive engagement with the participating students, indicating that live support may be more effective during initial experiments when students encounter more issues. Suggestions from tutors include offering tailored support based on student feedback and considering the feasibility of pop-up messages to direct students to support sessions. Future iterations may benefit from aligning support sessions with high student booking periods and exploring alternative methods to enhance student engagement. Further modules have been identified for potential live support trials based on the survey feedback from module chairs.

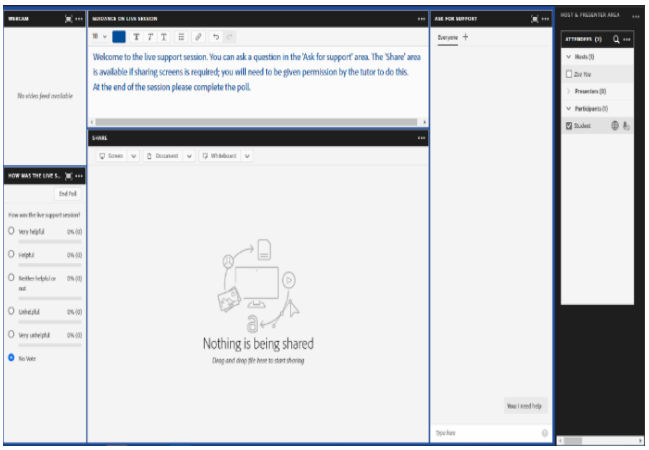


Figure 2: Tutors' Adobe Connect view for live support sessions. Tutors had enhanced privileges, such as admitting students, arranging breakout sessions, and enabling screen-sharing. Students could communicate through chat and voice, with an end-of-session poll included.

Refining the requirements of the live support prototype

To further refine the requirements of the prototype, a second round of surveys were conducted with both students and tutors in June 2023. A total of 41 students and 8 tutors participated, providing valuable insights and feedback. These surveys aimed to gather comprehensive input from both user groups, ensuring that the live support system is tailored to meet the diverse needs and preferences of all stakeholders involved in OSL activities.

Students identified several areas where they believed live support would enhance their experience with OSL experiments:

- Clarifying experimental protocols and measurements
- Assistance with experimental setup and equipment operation
- Receiving feedback on results and interpretation
- Understanding the overall task of an experiment
- Addressing technical difficulties with equipment and data analysis tools
- Importance of real-time assistance during experiments
- Support during the preparation phase
- Guidance on conceptual aspects of the experiments

Approximately 73% of the respondents (30 out of 41) expressed a preference for individual support, while approximately 27% preferred a group setting. The majority prefer using chat for live support (see Figure 4). Opinions on incorporating automated chatbots or AI assistants into the live support system vary. While some express skepticism or disagreement (13 out of 41), others are more open to the idea (12). A significant portion remains neutral (25), indicating a lack of consensus among respondents.

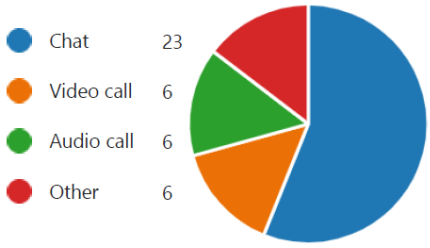


Figure 4: Students' preferred mode of communication for live support during OSL activities (Options: chat, video call, audio call, other).

Several respondents highlighted the importance of implementing specific accessibility features or accommodations in the live support system to cater to students with disabilities or additional needs including:

- Text-to-speech and speech-to-text functionality to assist students with visual impairments or dyslexia.
- Changing the background of the application for better viewing, which could benefit students with visual sensitivities or color blindness.
- Providing options for students to customize the user interface based on their individual needs, such as font size adjustment or high contrast mode.
- Ensuring that the live support system is compatible with screen readers and other assistive technologies commonly used by students with disabilities.
- Offering alternative communication methods, such as audio or video calls, to accommodate students with hearing impairments.

The tutors' survey reveals several common challenges students face during OSL activities. These include difficulties understanding experimental procedures, interpreting results, and managing time effectively. The key benefits of live support identified by tutors include saving time, enhancing understanding, and maintaining student motivation. Tutors currently use various resources like forums, email, and phone calls to support students, with text-based chat being the preferred mode for live support. Tutors emphasize the importance of clear communication, flexible availability, and empathetic engagement in providing effective support. While some express openness to incorporating automated chatbots or AI assistants, concerns remain regarding their ability to provide tailored support and address complex issues effectively.

A prototype system is being developed that features a prominently displayed button that flashes green when live support is available and turns grey when it's not. To facilitate scheduling, live support sessions would be flagged in the booking system, allowing students to choose them in advance when booking experiments. The development of the prototype is ongoing, and we plan to start testing in autumn 2024.

Conclusion

The implementation of real-time support in online laboratories has the potential to significantly enhance student engagement and satisfaction. By providing live support, students' learning experiences and outcomes in online laboratories can be improved. Additionally, real-time support can promote inclusivity by catering to the needs of students with disabilities or additional support requirements.

References

Broadbent, J., Lodge, J. (2021). Use of live chat in higher education to support self-regulated help seeking behaviours: a comparison of online and blended learner perspectives. Int J Educ Technol High Educ 18, 17 (2021). https://doi.org/10.1186/s41239-021-00253-2

Kbaier, D., Kear, K., Lockett, H., Sykes, P., Long, S. (2024). Enhancing Student Learning in OpenSTEM Labs Through Live

Support: The Lab Assist Project. In: Hong, W., Kanaparan, G. (eds) Computer Science and Education. Educational Digitalization. ICCSE 2023. Communications in Computer and Information Science, vol 2025. Springer, Singapore. https://doi.org/10.1007/978-981-97-0737-9_29

Kitsantas, A., & Chow, A. (2007). College students' perceived threat and preference for seeking help in traditional, distributed, and distance learning environments. Computers & Education, 48(3), 383–395. https://doi.org/10.1016/j.compedu.2005.01.008

Klein, A. Z., da Silva Freitas, J. C., Barbosa, J. L. V., & Baldasso, L. (2018). The educational affordances of mobile instant messaging (MIM): Results of Whatsapp® used in higher education. International Journal of Distance Education Technologies (IJDET), 16(2), 51–64. https://doi.org/10.4018/IJDET.2018040104

Koc, S., & Liu, X. (2016). An investigation of graduate students' help-seeking experiences, preferences and attitudes in online learning. Turkish Online Journal of Educational Technology-TOJET, 15(3), 27–38. https://eric.ed.gov/?id=EJ1106358

Lauricella, S., & Kay, R. (2013). Exploring the use of text and instant messaging in higher education classrooms. Research in Learning Technology. https://doi.org/10.3402/rlt.v21i0.19061

Luo, T., Sickel, J., & Cheng, L. (2017). Preservice teachers' participation and perceptions of Twitter live chats as personal learning networks. TechTrends, 61(3), 226–235. https://doi.org/10.1007/s11528-016-0137-1

McInnerney J. M., & Roberts T. S. (2004). Online learning: Social interaction and the creation of a sense of community. Educational Technology & Society, 7(3), 73–81. https://www.jstor.org/stable/https://doi.org/10.2307/jeductechsoci.7.3.73

Robles, H. R., Guerrero, J., LLinas, H., & Montero, P. (2019). Online teacher–students interactions using WhatsApp in a law course. Journal of Information Technology Education: Research, 18, 231–252.

Zimmerman, B. J., & Moylan, A. R. (2009). Self-regulation: Where metacognition and motivation intersect. In Handbook of metacognition in education (pp. 311–328). Routledge.

Moving towards enriched immersive learning scenarios: First steps of UNED360º Channel

Ángeles Sánchez-Elvira Paniagua[12], Ángel Mancebo Marcos[12] and Carlos Busón Buesa[3,2]

[1] UNED (Universidad Nacional de Educación a Distancia. Spain)
[2] UNED UNESCO Chair in Distance Education (CUED)
[3] Fundação de Apoio ao Desenvolvimento do Ensino, Ciência e Tecnologia do Estado de Mato Grosso do en colaboración con el Conselho Nacional de Desenvolvimento Científico e Tecnológico (FUNDECT/CNPq). Brasil.

Abstract

The National Distance Education University (UNED) has been incorporating innovative educational technologies since its establishment in 1972 to enhance its interaction with students and its teaching and learning processes. The Canal UNED 360º is an institutional research on teaching innovation project that aims to develop innovative multimedia content based on 360º videos and images. These videos capture reality from all directions, providing immersive learning experiences. They are supported by affordable technologies that can be distributed at high speed and are easily accessible through mobile technology and different devices with various immersion levels. Systematic reviews have shown that 360º videos provide new opportunities for educators and students to teach and learn in enriched, immersive, engaging, and inclusive educational environments, which can positively impact students' academic performance, well-being, and retention. The adoption of 360-degree videos in higher education shows promising benefits on teaching and learning, particularly for distance education students. The initial steps of the Canal UNED 360º project are presented here. The project's content will be openly available on a specific UNED Media channel and in the UNED Innovation Hub.

Keywords: *360º videos, immersive learning, students' engagement, distance education*

Introduction

Advancements in video technology are enhancing education by providing immersive and interactive experiences, which can significantly boost learner motivation. An immersive experience is defined as the perception of being physically present in a non-physical world by surrounding the user with images, sound, or other stimuli that make the user feel truly "there" (Freina and Ott, 2015). Immersive technologies such as Virtual Reality (VR), Augmented Reality (AR), and Mixed Reality (MR) enhance user interaction by blending digital and real-world elements. VR offers a fully immersive digital experience, AR integrates digital content with the real world, and MR merges aspects of both to allow virtual objects to interact with real environments. All these technologies are collectively known as Extended Reality (XR), covering all immersive digital experiences. XR technologies, however, although of great interest in the education field, imply high financial costs and time-consuming systems.

360º videos are commonly included under the broader category of Virtual Reality (VR), although they can be more considered as an advanced video format recording real environments and actions (Rosendahl & Wagner, 2024). They offer a panoramic video experience, capturing omnidirectionally around the camera simultaneously to provide a comprehensive and immersive view with varying levels of immersion; they require a camera with multiple lenses or multiple cameras that are stitched together to form a seamless spherical view and are accessible on desktops and smartphones with minimal immersion or through head-mounted displays (HMDs), even inexpensive VR headsets like a cardboard for a fully immersive experience. They also benefit from the distribution of content at high speed and the expansion of mobile technology, extending traditional video advantages without significant extra expenses, making them more affordable (Busón and Zamberlán, 2017, Rosendahl &

Wagner, 2024). Users can then interact with the video by moving their view in any direction, enhancing their sense of presence in the virtual environment. Adds-on can also be incorporated in post-edition to interact with 360º images, which let to include different learning resources.

360° videos can be particularly beneficial in educational settings. Different systematic reviews on the use of 360º educational videos present evidence of its positive effects for students showing similar and complementary results that can be summarised as follows (e.g. Lampropoulos et al. 2021; Pirker et al, 2020; Pirker & Vengel, 2021; Ranieri et al., 2020; Rosendahl & Wagner, 2024; Shadiev et al. 2023; Snelson and Hsu, 2020),: enhanced feeling of "presence" due to the sense of immersion; increased engagement, interest, and motivation for the content being studied; Improved attention, concentration, and retention levels; better perception of learning; higher levels of satisfaction and positive affect with the experience; personalized experience through individual control of the process; generation of different perspectives from different angles, facilitating the development of learning experiences closer to reality, such as in the development of internships; promotion of knowledge transfer to more realistic environments; access to environments or scenarios that the user would not be able to easily or at all, or recreation of scenarios and situations in a personalized and safe framework for the user.

360° videos have seen increasing application in different educational fields, particularly Medicine and Health Care (28.1%) followed by History and Social Studies (12.5%) (Snelson and Hsu, 2020). 360º videos are also gaining traction in STEM education, where they provide practical insights into laboratory settings and equipment handling, enhancing both safety and learning outcomes. Immersive videos can prepare students for physical engagement with these environments, potentially reducing accidents and improving competency acquisition.

Despite these advantages, the improvement of academic performance linked to immersive videos is not definitively proven, and there are reports of minor issues like dizziness or difficulty in use (Snelson and Hsu, 2020). The use of spherical video in education is still in its early stages and more research is needed to establish its effectiveness compared to traditional materials, though it is recognized as a potentially valuable supplementary educational tool.

Canal UNED 360º

Canal UNED 360º is an institutional Research on Teaching Innovation Project. It aims to utilize 360° videos and images to enhance educational content across various disciplines fostering a sense of proximity, presence, and engagement among distance education students. This approach could lead to improved motivation and overall student well-being and satisfaction, providing a holistic educational experience that extends beyond traditional learning modalities.

The project outlines different objectives structured to promote the effective use and development of 360° videos in UNED:

1. **Train Teaching Staff:** methodological and technical train of interested academic staff in the creation of 360° videos and associated learning activities for:
   - Understanding the basics of immersive and 360º video technology.
   - Familiarizing with devices and technologies needed for creating 360º videos.
   - Learning to create educational scripts adapted for immersive videos, involving experts in immersive audiovisual narration.
   - Developing innovative learning activities using 360º videos, incorporating methodologies that facilitate experimentation and improvement.
   - Handling basic technical skills in recording and editing 360º videos.
2. **Develop Pilot Experiences:** Facilitate pilot projects coordinated by the Deans' Offices of Faculties and Engineering Schools, as well as by interested teaching teams, to create 360º videos for students' orientation, information, and learning activities.
3. **Ensure Quality of Videos:** Implement quality standards developed during the project to assess the 360º videos and ensure their quality.
4. **Launch the UNED360 Channel** by UNED Media, dedicated to showcasing UNED's 360º video content.
5. **Evaluate the Effectiveness of 360º Videos:** Assess the impact and effectiveness of 360º video usage through evaluations and final analysis conducted by students, team leaders, and participating teachers. This evaluation will consider psychosocial variables and the *Technology Acceptance Model* (TAM) elements to measure acceptance and effectiveness (Venkatesh et al.2003).

In its first year of development of the project, several steps have been made towards its final objectives:

- **Initial motivation activities for the academic staff** through open webinars[1] and practical outdoor

[1] Webinars: Materiales inmersivos en entornos educativos, posibilidades y desafíos; Vídeos inmersivos. Presentación del proyecto UNED360.mp4

sessions using mobile phones to create spherical videos.

- **Design of the UNED360º logo** by UNED Media Communication team.
- **Creation of a coordination team in Microsoft 365 TEAMS** with all institutional representatives involved in the project for the preparation and initial monitoring of the project.
- **Acquisition of the necessary equipment and editing software** by the Instituto Universitario de Educación a Distancia (IUED) and UNED Media: two 360º cameras, memory cards, tripods and editing software (annual License 3DVISTA VT PRO).
- **Training Workshops** for the academic staff involved in the project:
  - Production of 360º videos and 360º virtual tours with augmented reality[2].
  - Practical on-hands workshops for using 360º cameras and essential editing software.
  - 360º video and image editing with H5P.
- Generation of **first pilot scripts** by the participants in the project for the generation of learning activities based on the use of 360º videos/images and interactive 360º tours.
- Creation of the **UNED360 Community** in UNED LMS to monitor the project.
- First pilot recordings in faculties and schools.
- Opening a **temporary private channel on YouTube** to upload videos before creating the definitive channel.

At present, different scripts for 360º videos and interactive 360º tours have been designed by participants in the project belonging to different disciplines, and approved to be produced:

- **Information and orientation activities**: institutional presentation of the buildings and facilities of the Faculties and Schools of Engineering of the UNED, including laboratories.
- **Learning activities from different disciplines**: Resources of the Central Library of Philological Studies of the UNED; Teaching from the children's point of view; Playgrounds as learning spaces; PSY-II. Child neuropsychological assessment; Ergonomics and virtual psychosociology: Work environments; Analysis of DNA fragments by electrophoresis on agarose gels; Radiation field of a horn/microwave antenna in the laboratory.

Some pilot recordings made in UNED Schools and Faculties are available on YouTube in a provisional channel.

Conclusion

Advances in video technology, including 360º videos, have significantly improved educational practices by offering immersive and interactive experiences. Systematic reviews have shown that 360º videos improve student engagement, attention, concentration, retention, satisfaction, and perception of learning in education. They also provide students with access to hard-to-reach environments, offering affordable, realistic, and safe learning scenarios. Additionally, 360º videos can enhance personalization and allow for different individual perspectives and approaches to be shared, providing valuable learning opportunities for both teachers and students. These findings highlight the benefits of using 360-degree videos in distance education. They can help students become familiar with institutional facilities such as laboratories and can promote innovative and inclusive learning activities that cater to students' diversity and needs.

UNED Canal 360º aims to continue promoting enhanced immersive learning experiences for our distance education students and to further evaluate their effectiveness in improving student engagement and academic performance. This project was presented at the EADTU Annual Conference held in Istanbul from 4 to 6 October 2023 (Sánchez-Elvira et al.2023) and in the EADTU *EMPOWER Webinar Week on The Rules of Engagement: Immersing Students in Online Education* (Sánchez-Elvira, 2003[3]).

Comparable examples

Many comparable examples can be found in the systematic reviews mentioned in the references.

[2] Training workshop Production of 360º videos and 360º virtual tours with augmented reality. UNED360 Project

[3] Sánchez-Elvira Paniagua, A.(2023). https://www.youtube.com/watch?v=V1uzwwEyDI8

References

Busón Buesa and Zamberlan, C.O, (2017). Development of immersive environments for training in territorial development. Immersive environments for training in territorial development. *IGpec Report, 21*, 1, p.169.184

Freina, L., & Ott, M. (2015). A literature review on immersive virtual reality in education: State of the art and perspectives. *eLearning & Software for Education, 1*, 133-141. https://doi.org/10.12753/2066-026X-15-020

Lampropoulos, G., Barkoukis, V., Burden, K. *et al.* (2021).360 degree video in education: An overview and a comparative social media data analysis of the last decade. *Smart Learning Environments*.8, 20. https://doi.org/10.1186/s40561-021 00165-8

Pirker J, Dengel A. (2021). The Potential of 360° Virtual Reality Videos and Real VR for Education-A Literature Review. *IEEE Comput Graph Appl.* 2021 Jul-Aug;41(4):76-89. doi: 10.1109/MCG.2021.3067999

Pirker, J., Lesjak, I., Kopf, J., Kainz, A. & Dini, A. (2020). Immersive learning in real VR. In M.Magnor & A.Sorkine Hornung (Eds.) *Real VR-Immersive Digital Reality*. Springer, pp.321-336, https://link.springer.com/chapter/10.1007/978-3 030zz41816-8_14 https://doi.org/10.1007/978-3-030-41816-8

Ranieri, M., Bruni, I., & Luzzi, D. (2020). Introducing 360-degree video in higher education: An overview of the literature. *Human and Artificial Intelligence for the Society of the Future*. https:// doi. org/ 10. 38069/ edenconf- 2020-ac0032.

Rosendahl, P. & Wagner, I. (2024). 360° videos in education. A systematic literature review on application areas and future potentials. *Education and Information Technologies 29*, 1319–1355 https://doi.org/10.1007/s10639-022-11549-9 1 3

Shadiev, R., Yang, L., & Huang, Y. M. (2022). A review of research on 360-degree video and its applications to education. *Journal of Research on Technology in Education*, *54*(5), 784–799. https://doi.org/10.1080/15391523.2021.1928572

Sánchez-Elvira Paniagua, A., Mancebo Marcos, A.& Busón Buesa, C. (2023). *Moving towards enriched immersive learning scenarios: First steps of UNED360 channel*. IHE2023 EADTU Conference. Instambul, 4-6 October

Snelson, C., & Hsu, Y. C. (2020). Educational 360-degree videos in virtual reality: A scoping review of the emerging research. *TechTrends, 64*, 404-412. https://doi.org/10.1007/s11528-019-00474-3

Venkatesh, V., Morris, M.G., Davis, G.B., Davis, F. D. (2003). User Acceptance of Information Technology: Toward a Unified View.*MIS Quarterly 27* (3): 425- 478. https://doi.org/10.2307/30036540

Belonging with, not to: Cultivating Agency and Belonging through a Students-as-Partners Project in the Open University, UK

Lorna Sibbett and Dr Renu Bhandari

The Open University, United Kingdom (UK)

Abstract

Higher education is grappling with the challenge of fostering student belonging and agency in an increasingly consumerist environment. The Students-as-Partners (SaP) approach emerges as a powerful response, offering a liminal space where students and faculty co-create knowledge, dismantle traditional hierarchies, and act as change agents together. We report a SaP project in which two students from under-represented groups engaged in scholarship of inclusive practice in distance learning. The key research questions were: Do student interns increase their sense of belonging, including being part of a wider university community, not limited to module or programme? Do interns consider their employability to increase via such roles? The project findings suggest that when power relationships are explicitly addressed within students-as-partners projects, student partners develop agency, employability-related skills and sense-of-belonging. SaPs can facilitate a paradigm shift from belonging to an institution towards belonging with individuals and diverse communities. Such investment in building equitable relationships among staff and students, affords opportunities for student partners to contribute richly to teaching, learning design, student experience and policy. By fostering agency through shared expertise and inclusive co-creation, SaP offers a transformative pathway towards a more vibrant and equitable learning environment for all.

Keywords: *students-as-partners, inclusion, belonging, distance learning, agency*

Introduction

The liminal space of student-staff partnerships (SaP) affords refuge from the consumerist delivery-focused language pervading higher education. Matthews (2018) suggests that SaP operates as a counter-narrative to this *consumer* model and to the traditional hierarchy of a *teacher-student* model. Partnerships enrich a sense of belonging among students and staff:

> '*pedagogical partnership can foster in students a* ***sense of belonging****, support faculty in generative reflection, and contribute to the evolution of an institution into a place where members of the community feel a meaningful connection'.* Cook-Sather, Bahti and Ntem (2019)

This "belonging with," rather than simply "belonging to," cultivates a spirit of active collaboration and shared responsibility, dismantling hierarchies and transforming the institution into a space of meaningful connected learning. Challenging the traditional "tutor as expert" model, SaP recognizes students as valued colleagues and knowledge contributors with unique perspectives and expertise (Cook-Sather et al., 2014).

As 'students often lack agency and voice' (Mann, 2008 as cited in Bovill et al 2016), there is an imperative to invest time and build structures where students develop confidence in using their voice. SaP initiatives can actively create spaces where students develop confidence in using their voices and become agents of their own learning (Shank and Cruz, 2023). However, for real student agency equitable partnerships are essential (e.g., Cook-Sather, Bovill, and Felten, 2014). Power dynamics and inequalities inherent in the academic environment can impede genuine partnership and inclusivity. In the context of distance learning, creating equitable student-staff partnership is comparable to the creation of effective work teams in distributed work environments. Acknowledging these complexities is crucial to thriving belonging, collaboration, and mutual learning in the liminal space where SaP operates.

Project

Established over 50 years ago, the Open University (OU) in the United Kingdom (UK) provides supported distance learning via predominantly online tools. Its staff are located throughout the UK and Ireland; its students across the globe. Pre-Covid, some face-to-face teaching provided opportunities for both students and staff to meet, establish relationships and feel connected. Likewise, staff groups would meet regularly on our main Milton Keynes Campus. However, a combination of financial pressures and the inequity that such events are less accessible for those who are carers, has prompted focus on how we can develop a sense of belonging among people who may never meet in person.

Since 2018, the OU(UK) has offered virtual internships for students to afford work experience and develop employability related skills (Reid et al, 2023). These opportunities are now offered across all four faculties, affording some sustainability in students-as-partners and development of capacity-building in successful management of these.

Informed by these prior successes, the BUD (Belonging, United, Diverse) project sought to understand how student belonging may be developed through partnership. Two student interns were appointed to work as scholarship partners in development of an inclusive learner community. They acted as 'buddies' in student asynchronous online discussion forums (ODFs) of Open University Access modules. They provided lived experience from identities of Black ethnicity and neurodivergence, specifically autism. Both were carers.

Bovill et al (2016) identified four student roles in co-creation of learning and teaching: co-researcher; consultant, pedagogical co-designer and representative. Our BUD interns were engaged to act primarily as consultants and co-researchers. Following discussion as to whether a person could be expected to represent the diverse people that may be autistic, Black or both, it was agreed that BUD interns were explicitly not representatives. Their lived experiences informed their roles as consultants and were lenses through which they contributed as co-researchers.

Each intern met weekly online with the project lead, who was their line manager and took responsibility for agreeing priorities and supporting interns to achieve their personal and project goals. Each such meeting included: an informal report from the intern on their recent achievements and any barriers / challenges; reflection against project aims; discussion of the local Access / Open University or Higher Education sector context; discussion of potential next steps; and review of intern priorities / activities for the next week or phase. Whole project team meetings were scheduled around specific activities rather than at regular time intervals; there was a clear focus and anticipated deliverable for each team meeting e.g. formulation of a survey or agreeing individual responsibilities for each ODF. Interns were encouraged to collaborate with one another out-with project-related meetings and they chose to do this via email.

Power relationships were explicitly considered and addressed within the project, beginning with fair payment for interns as a means to demonstrate, and ethically deliver, tangible parity of value for student lived experience and staff professional / lived experience. Recognising that 'students often lack agency and voice' (Mann, 2008 as cited in Bovill et al 2016), the project team was kept as small as possible in an effort to ensure that student voice would not be drowned by multiple staff voices. Although the project was well outlined before interns took up their roles, flexibility was retained to ensure that interns could shape activities, priorities, and final outputs.

Interns initially reflected on their prior student experiences of ODFs in the Open University and developed draft guidance for ODF management that would be more inclusive and better meets their requirements, based upon their lived experience. In their ODF 'buddy' role, they engaged autonomously with the Access students, whilst having background support of a staff moderator with whom they could raise any concerns. Following their period of action as 'buddy', the interns met with the wider project team for collaborative reflection, which informed their revisions of initial guidelines on inclusive ODF use.

To evaluate our students-as-partners approach and intern gains, each intern wrote a short reflective 'blog'.

Findings and discussion

In their reflective blogs both interns shared how their sense of belonging to the Open University student community, and sense of emerging self, developed through contributing within the project.

1. Opportunities for personal development

For real student agency, equitable partnerships are essential (e.g., Cook-Sather, Bovill, and Felten, 2014). SaP initiatives can actively create spaces where students develop confidence in using their voices and become agents of their own learning (Shank and Cruz, 2023). However, for real student agency equitable partnerships are essential (e.g., Cook-Sather, Bovill, and Felten, 2014). Both interns, expressed their motivations for being an intern in terms of opportunities for personal development and making a contribution. In their reflective blogs each identified specific employability skills they had developed.

"In this internship I have been able to develop my analytical skills which I had never had the opportunity to do before."

Re being an ODF 'buddy',

"The skill I developed by doing this is my communication with a wider range of people from different walks of life."

Shank and Cruz (2023) suggest value in students-as-partners programs in developing students as agents of their own learning. One demonstrated agency in her pursuit of existing literature on autistic student support and experience in HE; and the other in her shaping of buddy activities for the forums. SaP initiatives can actively create spaces where students develop confidence in using their voices and become agents of their own learning (Shank and Cruz, 2023).

2. Enhanced employability and professional skills

Both reflected upon specific gains in **employability-related skills**, including the mechanisms, language, and inter-personal relationships that may be valuable in work-based communication.

"*Whereas before, I had only had a limited exposure to group work and the intimidating formalities of 'TEAM MEETINGS', now, through the use of remote systems like Microsoft Teams, I feel I have gained more confidence in speaking up (and gauging when it's appropriate to so), as well as persevering with all the complications that modern technology can throw at me"!*

Our intern with highly developed technical skills set herself personal goals in developing her language use in ODFs. She was pro-active in generating ideas and content for threads in the forums and swiftly engaged with students.

3. Sense of Belonging

Student sense of integration into university life and sense of belonging are considered important in development of strong student engagement (Bryson, 2014). Our interns' reflections provide evidence of potentially transformative strength in student engagement. The sense of belonging and developing multiple identities at the same time came out strongly in the analysis of the blog reflections.
One articulated a developing empowered **sense of belonging** as a student partner in shared enterprise for improved student experience:

"Essentially you are engaging with both worlds of the Open University and interlinking them to bring forward ideas and recommendations to make students experiences better."

A developed sense of belonging was expressed in the context of making a contribution for students who struggle to be heard.

"..it felt very rewarding to be able to lend an empathetic ear to those who may have felt unseen or potentially isolated within the student community."

Early in the project, one intern expressed an interest in following a strand of inquiry into literature and previously published guidance on support for autistic students within Higher Education (HE). She worked with the Project Lead to agree scope and focus for this and, at project end, delivered a set of recommendations based upon a weaving of her lived experiences of autism into the broader context of current sectoral practice. SF demonstrated growth in agency and in self-efficacy with regard to research activity and her personally unanticipated growth in self-awareness.

"my independent research into the Autistic experience in Higher Education environments, has proven itself to be a deeply personal, formative, and fascinating undertaking."

"as I identified with clusters of Autistic 'traits' in academic literature, that I had previously …. dismissed in contrast with the severity of my sibling's Autism, was self-affirming. In addition to reinforcing my confidence to seek out a formal diagnosis, this was certainly not something that I was not to come out with on this internship!"

Conclusion

The BUD project contributes evidence that: student partners can develop their sense of belonging, employability, and agency within the context of a well-supported staff-student scholarship project. Equity demands a sustainable approach to internship provision and explicit consideration of the power dynamics in partnerships. Maximal gains in distance learning and student experience are achieved when students belong "with" staff and one another rather than belong "to" an institution.

Funding This project was funded by The Open University's, Teaching Excellence Fund (TEF) and the Pan University Scholarship Fund.

Acknowledgements Our grateful thanks to our student Interns Nadiah and Sarah who have contributed to the project and to this report.

References

Ajjawi, R., Gravett, K. and O'Shea, S. (2023) 'The politics of student belonging: identity and purpose', Teaching in Higher Education, 0(0), pp. 1–14. Available at: https://doi.org/10.1080/13562517.2023.2280261.

Bovill, C. et al. (2016) 'Addressing potential challenges in co-creating learning and teaching: overcoming resistance, navigating institutional norms and ensuring inclusivity in student–staff partnerships', Higher Education, 71(2), pp. 195–208. Available at: https://doi.org/10.1007/s10734-015-9896-4.

Bryson (2014) 'Understanding and Developing Student Engagement'. Taylor and Francis. Available at: https://doi.org/10.4324/9781315813691

Cook-Sather, A., Bovill, C., & Felten, P. (2014). *Engaging students as partners in learning and teaching: A guide for faculty*. John Wiley & Sons.

Cook-Sather, A., Bahti, M. and Ntem, A. (2019) Pedagogical Partnerships. Elon University Center for Engaged Learning. Available at: https://doi.org/10.36284/celelon.oa1

Mann, S. J. (2008). 'Study, power and the university'. Maidenhead: Open University Press.

Matthews, K. E. (2018). Engaging students as participants and partners: An argument for partnership with students in higher education research on student success. *International Journal of Chinese Education*, *7*(1), 42-64.

Office for students (2024) Student characteristics data: student outcomes – key findings Students at English higher education providers between 2010-11 and 2021-22 Student characteristics data: student outcomes – key findings (officeforstudents.org.uk) (accessed on 28.3.24)

Payne, H., Cantwell, J. and Bristow, R. (2023) 'A student-staff partnership conducting research in higher education: An analysis of student and staff reflections', International Journal for Students as Partners, 7(1), pp. 96–109. Available at: https://doi.org/10.15173/ijsap.v7i1.5122

Reid, K., Butler, D. L., Comfort, C., & Potter, A. D. (2023). Virtual internships in open and distance learning contexts: Improving access, participation, and success for underrepresented students. *Distance Education*, *44*(2), 267-283. https://doi.org/10.1080/01587919.2023.2209029

Shank, M. and Cruz, L. (2023) 'Driver's seat: A qualitative study of transformational student partnerships in SoTL', International Journal for Students as Partners, 7(1), pp. 110–127. Available at: https://doi.org/10.15173/ijsap.v7i1.5063.

Providing asynchronous online rapid assessment-related support

Susan Pawley, Claudi Thomas and Cath Brown

The Open University, UK

Abstract

Assessment is essential to student learning, but is commonly experienced as stressful by students, and this is particularly true for those who are time-poor due to other responsibilities. Anxiety about being judged for experiencing difficulties by the person marking their work is a particular issue for unconfident students, which can lead them to avoid seeking help from official sources. Such students may informally seek help from peers, which can lead to misinformation or temptation to collude or plagiarise.

We set up asynchronous Rapid Response Forums to enable students to have their queries answered accurately in a timely manner by experienced academic staff who were not marking their work. This reduces any perceived need to go to unofficial sources for support, normalises the idea of help-seeking and facilitates completion of the assessments for those working unconventional hours.

The use of experienced educators to answer queries ensures students' understanding is enhanced, not solely their assessment performance. The knowledge that these forums are available also supports students who do not use them directly, since they are aware that they can have any questions answered rapidly, reducing their anxiety.

The approach of offering greater support to students in assessment completion, whilst still requiring them to demonstrate learning outcomes, has the potential to develop academic confidence, thus enhancing retention and completion.

Keywords: *student support, continuous assessment, plagiarism, learning culture*

Introduction

For distance learning students, regular encouragement to increase knowledge and understanding, and refine skills over time is crucial for success. The majority of distance learners are time-poor, due to work, caring responsibilities or other commitments (Blackmon and Major 2012); for such individuals, "student" is rarely their primary identity. It is very easy in these circumstances for study to be de-prioritised; educators therefore need to design modules to incentivise frequent study and promote continued engagement.

Module design impacts how students interact with their learning and the creation of activities that promote engagement is key (Robinson et al 2008), however, many students will only engage with tasks that are linked to their final grade (Rust 2002); assessment design is a priority in keeping such students on track. Completing an assessment and receiving feedback is an important step in developing sense of belonging as a student (Chapman 2017), but assessment outcomes can be "make or break" for students at early stages of their study. Ensuring assessment offers opportunities for building confidence can be crucial in retention; timely, specific feedback is needed, alongside enabling success in early assignments in particular (Meer and Chapman, 2014).

At The Open University, UK (OUUK), a programme of continuous assessment, either summative or formative, is used to prompt regular study and engagement with the module material. This not only ensures students interact at various points throughout their study but offers encouragement to deep-learn the key concepts of the

module, and provides the necessary regular in-depth feedback to keep students on track, highlighting both successes and learning gaps. Frequent, low-stakes assessment can boost confidence and encourage further study, and gives students an opportunity to address issues raised and use feedback to develop their skills.

Alongside its benefits, continuous assessment can lead to students feeling overwhelmed and under pressure to continually perform well. Additionally, other commitments of many distance learners that reduce the time they have available to study can lead to increased levels of anxiety, preventing them from studying effectively. These pressures may heighten the temptation to plagiarise, either from each other (Koh et al, 2011) or using the Internet or Generative Artificial Intelligence (AI). Being time-poor may also lead students to study only towards assessment tasks, which can reduce satisfaction and result in inconsistent learning and knowledge gaps affecting future studies.

Academic Support at OUUK

OUUK teaches through supported distance learning. Apart from the fixed points of assessments, students have the flexibility to study at their own pace. Several forms of academic support are provided:

Each student is assigned a tutor (teaching focus academic), who supports a group of students within the module. The tutor plays a key role in continuous assessment; they mark and feed back on their students' work and can authorise extensions to deadlines, making them an important factor in whether continuous assessment is a positive experience. The main contact between student and tutor is by email; this allows students to send a query when it arises and the tutor to prepare a thorough written response, but may take time.

Online synchronous support is offered in the form of tutorials, which are usually recorded. However students are often reluctant to ask questions in this environment (Campbell et al 2019).

Students can choose to receive peer support by posting in asynchronous forums. While some students find these a source of community, others feel frustrated by the technology. It can also be difficult to create a positive forum culture (Griffin and Roy 2022). Unfortunately, one negative forum experience can lead students to reject the format entirely, leaving them comparatively isolated from their peers, or dependent on unregulated social media groups for peer interaction, which may exacerbate plagiarism risks.

Asynchronous Rapid Response Forums

During consultations run by the School of Mathematics and Statistics, students indicated they had worries during the run up to continuous assessments and wanted more support, especially close to the deadline.

As well as worries about response times, there are significant numbers of students who feel reluctant to ask questions of their own tutor because they fear judgement by the person marking their work; reassurances do not always dispel this concern. Students also worry about how much support they can legitimately seek, with university policy stating that their assignment must be entirely their own work.

To ease concerns, asynchronous Rapid Response Forums were created on three key modules, giving students the chance to ask questions with a guaranteed response in less than 24 hours (in practice typically in under two hours). The forums are private, so students can see only their posts and the responses to them. The responses are only given by one of a small team of experienced tutors. Students' own tutors are not aware of whether they have posted in the forum, so they can ask without fear of judgement.

Students are encouraged to ask direct questions about the assessment and help is in the form of hints and tips on how to resolve their question, which are framed so the assessment will still be the student's own work. The closed nature of the forums means students can be assured that the responses they receive will always be compassionate and supportive.

The forums are open for one to two weeks before the assessment deadline dependent on the module, with the modules studied earlier in the degree, with less experienced and less confident students, open for longer.

If students post multiple times on the forum, the hints will also help them to improve their self-efficacy as a distance learner by developing their skills in resolving difficulties.

The forums (alongside other factors including a generous extensions policy) are part of developing a compassionate approach to assessment; this is not just offering practical support with assignments, but establishing a culture in which students needing support is normalised, rather than seen as a weakness.

A further benefit is that the existence of these forums disincentivise the seeking of "unofficial" help from fellow students via social media. Whilst mutual support is desirable *per se*, students in unofficial spaces may offer full solutions (which is unacceptable), inaccurate information, or even if well-informed and well-intentioned, are generally less adept

than educators in giving constructive hints. These forums offer students a space where they can ask freely, confident in the knowledge that responses will be correct, appropriate, and with no risk of plagiarism.

Since their instigation the forums have been well used, and qualitative feedback sought via surveys provided insight into the reasons why students value them. The initial reason for opening the forums was to improve students' support; as highlighted by one student "*Contacting a tutor can be a lengthy process and wait*". The benefit of rapid responses is mentioned by another student "*I found that forum so helpful due to the speedy answers which are really helpful in the stressful last few days before handing in an assignment*".

They have the added advantage of helping students who are less confident and allowing them to attempt questions: *"These forums helped me to increase my score by attempting questions I was unsure on enabling me to gain some marks for my ideas".* One student even said that being able to ask on the forum kept her on the module, as she was on the verge of giving up due to finding a particular assessment so challenging.

We found benefits reported even by students who had not used them, "I didn't use this, but it is comforting to know there is a backup for last minute panics". Feedback also confirmed that students who used the forum rather than searching the internet for help found their study more effective.

Conclusion

For time-poor, distance learning students, completing assignments to a deadline can be very stressful. A simple initiative of ensuring that students have rapid trustworthy advice at this time can be the difference between them continuing with their studies or withdrawing. It can also help with confidence to attempt a question and reduce the temptation to plagiarise. The reach of these forums goes beyond those students that use it, with a ripple effect giving confidence to students just by knowing it is there. The promotion of the culture of seeking support should enhance student success even on modules where these forums are not in place. This initiative has been taken up outside the School of Mathematics and Statistics, and we hope to see it extend further.

References

Blackmon, S.J. and Major, C. (2012), Student experiences in online courses: a qualitative research synthesis, *Quarterly review of distance education*, 13(2), 77-85, Available online: student-experiences-online-classesqual-study.pdf (cu.edu)

Campbell, A., Gallen, A., Jones, M. J. and Walshe, A. (2019), The perceptions of STEM tutors on the role of tutorials in distance learning, *Open Learning: The Journal of Open, Distance and e-Learning*, 34(1), 89-102, https://doi.org/10.1080/02680513.2018.1544488

Chapman A. (2017), Using the assessment process to overcome Imposter Syndrome in mature students, *Journal of Further and Higher Education* 41(2), 112-119, https://doi.org/10.1080/0309877X.2015.1062851

Griffin, L. and Roy, J. (2022), A great resource that should be utilised more, but also a place of anxiety: student perspectives on using an online discussion forum, *Open Learning: The Journal of Open, Distance and e-Learning*, 37(3), 235-250, https://doi.org/10.1080/02680513.2019.1644159

Koh H.P., Scully G. and Woodliff D.R. (2011), The impact of cumulative pressure on accounting students' propensity to commit plagiarism: an experimental approach*, Accounting and Finance* 51 (4), 985-1005, https://doi.org/10.1111/j.1467-629X.2010.00381.x

Meer N. M. and Chapman A. (2014), Assessment for confidence: Exploring the impact that low-stakes assessment design has on student retention, *The International Journal of Management Education* 12(2), 186-192, https://doi.org/10.1016/j.ijme.2014.01.003

Robinson, C. C., and Hullinger H. (2008), New Benchmarks in Higher Education: Student Engagement in Online Learning, *Journal of Education for Business* 84(2), 101–109, https://doi.org/10.3200/JOEB.84.2.101-109

Rust C (2002), The impact of assessment on student learning: How can the research literature practically help to inform the development of departmental assessment strategies and learner-centred assessment practices?, *Active Learning in Higher Education*, 3(2), 145–58, https://doi.org/10.1177/1469787402003002004

Wiki as an open educational resource in asynchronous courses: benefits and challenges

Béatrice Pudelko

Departement of Education, TÉLUQ University

Abstract

Since 2013, TÉLUQ University (Quebec, Canada) has been using MediaWiki software for the Wiki-TEDia project to build an open educational resource (OER) aligning the asynchronous nature of wiki writing with self-paced student learning and the institutional model of continuous enrollment. Wiki-TEDia applies contribution-oriented pedagogy and OER-enabled pedagogy in self-paced educational technology courses. The primary goal of Wiki-TEDia is to create a comprehensive repository of scientific knowledge on teaching methods and strategies, engaging students in the collaborative creation of OERs beneficial to their professional community. The repository has grown continuously, achieving its goal of creating a detailed inventory of teaching methods. By 2023, after 10 years, Wiki-TEDia contained 135 teaching models, methods, and strategies, each described on a separate web page. Despite variations in form and scientific quality, the number of visits and positive feedback confirm the repository's success and social relevance. A quantitative evaluation conducted in July 2021 revealed that the repository had accumulated 5.5 million unique visits. Student participation has exceeded expectations. They expressed satisfaction and pride in contributing to the wiki and appreciated the repository as a valuable resource for their professional practice, even after leaving the university. The Wiki-TEDia project successfully embodies the core attributes of open pedagogy in distance learning, including participatory technologies, openness and transparency, innovation and creativity, sharing ideas and resources, a connected community, learner-generated content, reflective practice, and peer review.

***Keywords**: wiki, open educational resource, open educational practice*

Introduction

Wikis are one of the participatory tools for digital publishing in Web 2.0. Implemented using wiki engines, which are a type of multi-author content management system, they allow the instant creation, modification, and publication of pages within a website. Their features encourage the emerging structuring of published content, open participation, and easy, continuous, and potentially infinite revision. Furthermore, wikis are characterized by the publishing process being transparent. This is a consequence of the visibility of changes made and the archiving of successive versions. Additionally, they provide participants with the opportunity to structure and control both the process and the outcome of their work through asynchronous communication on discussion pages.

Wiki tools have a unique potential to change educational practices, epistemological and pedagogical philosophies, and the roles of students and teachers in higher education and adult learning. This transformation is made possible by the collaborative and community-oriented nature of wiki-based learning, which emphasizes many attributes of open pedagogy (Barajas and Frossard, 2018, Zheng et al. 2015).

Wikis as Open Educational Resources in Higher Education

Wiki-based projects exemplify the principle of open pedagogy, which posits that the consumption and creation of

knowledge are complementary and mutually reinforcing processes (Hegarty, 2015).

On one hand, they allow for contributions that align with the five R's of Open Educational Resources (OER): Retain, Reuse, Revise, Remix, and Redistribute (Wiley & Hilton, 2018).

On the other hand, they can promote a wide range of Open Educational Practices (OEPs), defined as practices around the creation, use and management of open educational resources with the intention of improving quality and innovation in education (Andrade et al., 2011).

Wikis for Asynchronous Collaboration in Distance Education

Wikis are versatile tools that offer a wide range of pedagogical possibilities, depending on the theoretical and epistemic framework, desired learning outcomes, learner characteristics, and institutional, organizational, and temporal constraints. In the context of campus teaching, wikis are used as collaborative spaces for the completion of small-group writing projects. The lifespan of these wiki-based projects corresponds to that of the groups involved, whether a class or a team. One of the most important advantages of wikis in a distance education setting is that they provide the asynchronous collaboration opportunities appropriate for self-paced courses. In this context, they offer the possibility to conduct projects whose duration is not immediately constrained by the time limits of classroom teaching.

The Wiki-TEDia Project at TÉLUQ

TÉLUQ University is the only French-language distance teaching university in Canada, located in the province of Québec. Its unique institutional framework is characterized by continuous enrollment, which allows students to learn at their own pace with individualized support from tutors. Most students are women who need to reconcile their professional and personal lives.

The Wiki-TEDia project was designed by the author in 2013 as an component of her self-paced online course in graduate educational technology programs (the French abbreviation "TED" was used to name the wiki project scope) (Pudelko, 2019). The primary objective of this course, entitled Teaching Strategies: A Cognitive Approach, was to facilitate the acquisition of knowledge and skills enabling students to select and adapt teaching methods and strategies in the instructional design process. The principal challenge of the course was to provide students with access to a comprehensive repository of teaching methods that they could explore and utilize. At the time, such a knowledge base did not exist within the French-speaking educational community. Rather than creating a ready-made repository for students, our team implemented contribution-oriented pedagogy (Collis & Moonen, 2005) and OER-enabled pedagogy (Wiley & Hilton, 2018) to enable students to build an open public repository of knowledge in the field. In this way, students could both learn and contribute to the expansion of the public domain of knowledge on teaching methods.

Attributes of open pedagogy	Implementation of open pedagogy in Wiki-TEDia
Use of participatory technologies	Use of Mediawiki, free and open-source wiki software licensed under GNU General Public Licence (GPL)
Develop trust, confidence, and openness for working with others	Wiki-TEDia is hosted on the TÉLUQ server to foster students' confidence and sense of security in the public writing process. All TÉLUQ students and employees are granted writing rights by default. An explanation of the value of caring conduct and constructive criticism for learning is provided.
Encourages spontaneous innovation and creativity	Students contribute to Wiki-TEDia according to their interests and perception of personal and community knowledge needs. They can propose their own ideas and projects for improving the form and content of Wiki-TEDia.
Share ideas and resources freely to disseminate knowledge	All Wiki-TEDia content is available on the web under the Creative Commons license, Attribution-Share Alike (BY-SA 4.0). Students are encouraged to reuse existing open education resources respecting their publishing license.
Participate in a connected community of professionals	The enduring nature of Wiki-TEDia enables users to consult and respond to contributions from students with diverse professional backgrounds, as well as other TÉLUQ employees, spanning multiple years (2014-2024). Many students continue to utilize Wiki-TEDia in their professional practice.
Facilitate learner's contribution to OER	Participation is guided by instructions for activities, writing templates, quality criteria, an editorial line, technical support, and other factors. The teacher adapts the guidance as Wiki-TEDia evolves and students' learning needs change, ensuring that the guidance remains relevant and appropriate.
Engage in opportunities for reflective practice	Iterative contribution and the importance of revision in the writing process are emphasized in the learning activities proposed in Wiki-TEDia. Teachers provide constructive feedback on both the process and the content of knowledge building.
Contribute to open critique of others' scholarship	Students are encouraged to provide constructive feedback on each other's work. Modelling and observational learning are facilitated by leveraging the transparency of the wiki.

Figure 1: Alignment of Wiki-TEDia with Open Pedagogy Attributes from Hegarty's (2015) Model.

We chose Mediawiki to implement a repository publicly available on the web. In contrast to the academic projects carried out directly on Wikipedia, where anyone can contribute, only TÉLUQ students and staff are allowed to contribute to our project. This decision was primarily motivated by our concern to provide an environment in which all students feel comfortable writing. Indeed, research shows that novice contributors to Wikipedia projects are often discouraged by the complexity of the process and the directive interventions of established Wikipedia contributors or administrators (Ford & Wajcman, 2017). Students' contributions could be "major contributions" consisting of creation, revision, and discussion of web pages describing a teaching method, or "minor contributions", including corrections, additions, comments, suggestions, feedback. Students could also contribute to meta pages, which allow them to propose changes, improvements and comments on

the Wiki-TEDia project. We emphasized learning by doing, modeling among students, and teacher support. Assessment of student work in the wiki included formative evaluation and ongoing monitoring of contributors' activities. The transparency of the wiki allows teachers to prioritize the value of learning processes over outcomes, facilitate modeling experiences and observational learning, and provide ample formative feedback.

Benefits for Students and the Educational community

The project took a long-term approach, aligning the asynchronous nature of wiki writing with self-paced student learning.This allowed the repository to grow continuously, fulfilling its primary goal of creating a comprehensive inventory of teaching methods. By 2023, after 10 years of existence, the repository contained 135 teaching models, methods and strategies, each described on a separate web page. Although the form and scientific quality of each page varies, the number of visits and the testimonies of appreciation we have received confirm the success and social relevance of the open repository. According to a quantitative evaluation conducted in July 2021, the repository has accumulated 5.5 million unique visits.The top 10 strategies which have been visited more than 100,000 times, include experiential learning, 4-MAT, case-based learning, flipped learning, Bloom's Taxonomy, role play, exercices, Socratic dialogue, and cooperative learning. Regarding student participation, the results observed so far have exceeded what could have been expected based on the findings formulated in the available literature on the subject. Most students made around 40 minor contributions in addition to their main major contribution, which involved creating or revising knowledge in their personal project about a teaching method. A significant number of students expressed satisfaction and pride in contributing to the wiki, as well as their appreciation of the repository as a valuable resource for their professional practice, even after leaving the university.

Challenges

Wiki-TEDia experience allows us to highlight four key challenges for the success of wiki-based projects in distance education. First, it is essential to introduce and support students in adhering to a "wiki philosophy" that emphasizes openness and transparency in both the process and the product of writing. Ensuring the quality of the instructional design of wiki-based tasks, regardless of the level of openness and transparency chosen, is another important challenge. Careful preparation of project phases, learning activities, and assessments is necessary, even when learners are given a high degree of autonomy in using the wiki's functionalities and determining the modalities of their contributions. The quality of teacher guidance and support is also crucial and should take the form of scaffolding that adapts to learners' evolving skills and autonomy. Finally, another major challenge in the context of formal education is the choice and implementation of learning assessments that consider the authentic, collaborative nature of the work done in the wiki.

Conclusion

The Wiki-TEDia project successfully engaged students in the collaborative creation of open educational resources useful to their professional community. The potential for continuous growth and improvement of the wiki becomes an advantage in asynchronous self-paced courses. It allows students to contribute to knowledge building on their own schedule, while maintaining the collective spirit of open learning.

Comparable examples

EduTech Wiki at University of Geneva uses Mediawiki for sharing information on educational technology. It is written by students and teachers.
UBC Wiki at University of British Columbia uses Mediawiki as a open environment shared by students, staff an faculty to develop open resources and course projects.

References

Andrade, A., Ehlers, U. D., Caine, A., Carneiro, R., Conole, G., Kairamo, A. K., ... & Holmberg, C. (2011). Beyond OER–shifting focus to Open Educational Practices: OPAL Report 2011. Essen, Germany: Due-Publico.

Barajas, M., et Frossard, F. (2018). Mapping creative pedagogies in open wiki learning environments. *Education and Information Technologies, 23*(3), 1403-1419.

Collis, B. et Moonen, J. (2005). Collaborative learning in a contribution-oriented pedagogy. *Encyclopedia of distance learning, 1*, 277-283.

Ford, H. & Wajcman, J. (2017).” Anyone Can Edit”, Not Everyone Does: Wikipedia’s Infrastructure and the Gender Gap. *Social Studies of Science, 47*(4), 511-527.

Hegarty, B. (2015). Attributes of Open Pedagogy: A Model for Using Open Educational Resources. *Educational technology, August,* 3-13.

Pudelko, B. (2019). Concevoir et encadrer un wiki ouvert et évolutif dans un cours à distance : le projet Wiki-TEDia. In Lafleur, France; Grenon, Vincent et Samson, Ghislain (Eds), *Pratiques et innovations à l'ère du numérique en formation à distance* (p. 41-60). Québec, Canada : Presses de l'Université du Québec.

Wiley, D. et Hilton III, J. L. (2018). Defining OER-enabled Pedagogy. *International Review of Research in Open and Distributed Learning, 19*(4), 133-146.

Zheng, B., Niiya, M., et Warschauer, M. (2015). Wikis and collaborative learning in higher education. *Technology, Pedagogy and Education, 24*(3), 357-374. https://doi.org/10.1080/1475939

Exploring the Role of Blogs in Education: An Autoethnographic Study

Dr Lesley June Fearn, Dr Carol Azumah Dennis, Dr Jane Cobb and Dr Jonathan Hughes

The Open University

Abstract

This autoethnographic study investigates the transformative effects of academic blogging within higher education. Authored by four academics from diverse research areas, the study employs personal reflections to discuss how blogs enhance pedagogy, communication, and collaboration, fundamentally improving the educational experience for students and faculty members.

In the short term, it aims to encourage educators and learners by discussing how blogs can foster an interactive and participatory learning environment. Immediate benefits include enhanced student engagement and empowerment through increased access to academic discourse. In the long term, the study contributes to a shift in academic culture by challenging the traditional hierarchies within academia. Blogs are envisioned to play a crucial role in shaping future educational practices and policies by providing a platform for a more democratised approach to knowledge sharing. Over time, this could lead to broader systemic changes that promote a more inclusive, responsive, and open academic environment, ultimately impacting educational standards and practices globally.

Overall, this study highlights the value of blogging as a powerful tool for reflective practice, community engagement, and pedagogical innovation in education. It will interest a broad audience within the academic community and higher education. It will also appeal to those interested in the wider impacts of technology on communication, collaboration, and community building in educational settings.

Keywords: *Academic Blogging, Higher Education, Pedagogy, Innovation, Digital Tools, Motivation, Educational Technology, Autoethnography, Collaboration, Empowerment, Communication.*

Introduction

In today's world, digital technologies drive transformative changes across various sectors, including higher education (HE). Academic blogs represent a significant shift in academia and publishing as powerful tools for some educators. As four academics from diverse backgrounds, we collaborate as editors and bloggers on the Scholarly Conversation blog (Open University, n.d.). Our collective experiences illustrate that potential blogging facilitates interactive and participatory learning environments and enhances the educational journey for students and faculty.

This autoethnography discusses the impact of blogs on teaching and learning, examining their influence on pedagogy, communication, and collaboration within academia. We use our personal experiences as educators and learners, discussing how blogs, as digital tools, promote student engagement, empowerment, and skills development.

The first section debates the influence of blogging on teaching and learning practices. Dr. Dennis begins by introducing the aims of the Scholarly Conversation blog (Open University, n.d.). She uses Dr. Cobb's (2023) to show how blogging can challenge traditional views, foster community engagement, and encourage critical evaluation of educational practices and technology's role in society. Dr Cobb leads the next section by examining one of her blogs to explain how blogging serves as a crucial platform for

enhancing academic writing clarity, fostering open dialogues, and breaking down hierarchical barriers in academia, ultimately promoting more dynamic and inclusive communication and collaboration among students, tutors, and colleagues. In the third section, Dr Fearn uses the theory of Transformative Learning (TL) to debate blogging as an innovative tool in academic practice, enhances scholarly writing, aids in transitioning from practitioner to researcher, and supports TL through self-reflection, direction, and reconstruction. In the last section, Dr Hughes examines his blog for its significance in furthering student engagement, empowerment, and skill enhancement. He discusses his engagement with AI through blogging, emphasising how the process facilitated a deeper consideration of AI's implications for society and technology. He explains how his blog entry led him to explore various viewpoints on AI, including historical misjudgments in technology and the economic motivations behind AI development, enhancing his understanding and promoting a more critical approach to technology discussions among postgraduate researchers in the fields of wellbeing, education, and language studies (WELS).

Methods

The qualitative approach of this paper underscores how individuals perceive reality differently, shaped by social, cultural, and historical dynamics (Rogoff et al., 2017). Furthermore, we chose autoethnography because it emphasises the practitioner's voice as a reflexive analytical tool (Fearn, 2022b). According to Wall (2016), autoethnography is categorised into evocative and analytic types. Both perspectives emphasise authors as insiders through reflexive analysis, argued through literature to moderate bias (Ellis et al., 2011). Professor Dennis's, Dr Cobb's and Dr Hughes's sections can be described as evocative autoethnography because they focus on personal experience but are supported theoretically (Wall, 2006), while Dr Fearn's is analytic and, thus, a more traditional ethnography, but with her involvement explicit (Anderson, 2006).

Dr. Dennis: The Impact of Blogs on Teaching and Learning Practices

Blogging is the most popular form of social media in HE (Farmer, Yue, & Brooks, 2008). Even if we refuse the poverty masking and inequality negating normative discourse of 'digital natives', a contemporary cohort of students ', the net generation' (Lai & Hong, 2015) occupy pedagogic spaces quite unlike those featured before the ubiquity of digital technologies. The exponential growth in online learning is of particular interest for the context from which we write, the UK's largest and most prestigious online and distance learning University.

It is, therefore, with a degree of mild frustration then that I recount that as a senior lecturer working in an online and distance education university, I am yet to be part of an institutional conversation exploring the connections between Artificial Intelligence and HE that were not framed in terms of 'existential threat'. These discussions are, of course, taking place, but they seemed to be more quietly spoken.

PGR Blogger Jane Cobb's (2023) reflection on AI and Lecturing in HE was a welcome relief. In the post, she hints at the intricate rhetorical connection between AI and plagiarism as crisis talk, reminiscent of Stanley Cohen's (2011) 'moral panic'. The post successfully reorients the reader towards a more critically questioning approach to AI and its implications for HE. Instead of devoting our time to rooting out the accidental plagiarist – this post encourages tutors, lecturers, academics and students – to think about AI in slightly different terms.

Although it is impossible to map a comprehensive and empirically grounded line of flight from the blog to institutional practice in a short discussion space, blogs have considerable capacity to generate spaces of belonging (Duarte, 2016) and may also serve as a democratic platform to promote research activity, share information with like-minded others and cultivate disciplinary-specific, professionally oriented discussion.

We wanted the blog to create a space to develop a community for students, faculty, and alumni. We aimed to scale the edifice of the HE ivory tower in which everything is closeted behind a paywall. We wanted to create a porous university – deliberately blurring the lines between scholarship and activism.

Jane's post added another dimension to what the blog is and is for. Her reflections can substantially impact teaching and learning. Not only because she reorients talk of AI away from its usual synonymic associations, plagiarism, or unethical academic misconduct but also because she is one of the growing members of the community of Associate Lecturers who engage with the blog.

Jane encourages a slightly different discussion about this new technology. In doing so, she questions HE assessment practices. She claims that AI is only an existential threat to HE if we accept it as learning something a machine can mimic, regurgitating facts that an intelligent machine can replicate more quickly and accurately.

Is that learning? Does it really require intelligence? Do these approaches to assessment foster student engagement, empowerment, and skill enhancement? Might it be that a

continued discussion around AI that this blog post and others in a similar vein encourage with the AL community is one that reframes our understanding of AI? As stunning and surprising as these technologies are, can they be viewed as little more than a smart dictionary or digital calculator?

It is sometimes desirable to embrace new technology with breathless enthusiasm, extolling their Utopian possibilities while denigrating Luddites (Sadowski, 2021). But our initial refusal of poverty masking inequality negating normative discourses is again called into action. The Luddites were not opposed to technology as such. They defended working-class people against the political consequences of rampant capitalism. As we watch the rollout of AI, might we consider how work might be made more humane, less grindingly laborious, and workers gain more autonomy? I wonder how the AL community might engage with this possibility.

Pölönen (2021) expresses it quite clearly: trains, microwave ovens, aeroplanes, pacemakers installed in human bodies and robots making luxury cars in factories were once considered fanciful ideas, feared and mistrusted. They are now accepted as normal. Discussions such as those encouraged by Jane's post shed light on an important aspect of teaching and learning in HE.

The full dimension of and community responses to this discussion are yet to unfold, while the impact of the blog on teaching and learning practices is yet to shift from the possible to the actual.

Dr Cobb: How blogs enhance pedagogy, communication, and collaboration among students and staff

A persistent comment from my main supervisor on the numerous drafts of my doctoral thesis was that I needed to "sharpen up" my writing. Hence, the phrase "sharpen up" haunts me whenever I approach any academic writing, and within that, I include my own feedback comments for students on their assessed assignments. The need to "sharpen up"- editing and re-editing to sharpen the clarity of an intended message for an imagined audience - seems highlighted when preparing blog posts. For me, in bringing into focus that our academic writing is for an audience, an addressee, writing an academic blog post presents a valuable (and infrequent) opportunity for genuine dialogue and collaboration with colleagues, whether they be junior or senior in our institutional hierarchy – and of course, for "sharpening up" the presentation of an idea or issue.

The potential for ongoing dialogue through blog posting can achieve the type of dialogic communication presented by Bakhtin ([1934/35],1981:346) as an ideal char-characterised "unfinishedness and the inexhaustibility of our further dialogic interaction with it" (and see Halasek, 1999). If this seems a grand claim, contrast the limitations of other potential outlets for academic writing open to most of us for any ongoing and collaborative debate/discussion; an article for publication is accepted (or not) conditionally according to the requirements of the publisher; the requirement for summative grade allocation according to institutional values on students' assessed writing prevents such ongoing discussion with the writers' ideas and even engagement with tutor feedback comments (O'Donovan, 2016). Blogging can enhance communication and collaboration between colleagues and break down hierarchical barriers between students, tutors, and senior academics if all are open to sharing ideas.

However, sharing means being open to critical scrutiny putting ideas out there for others to evaluate and question. My experiences of feeling defensive when my own academic endeavours encountered queries and criticism led me to write a blog, 'Defending my work or being defensive?' (Cobb, 2024), pondering the border between defending our ideas and engaging with the views of others. Presenting a blog for peer review and, when published, with an invitation to a wider audience to respond is, for me, both an opportunity for collaborative discussion and one for seeing my writing through the eyes of others.

Communicating ideas clearly to an audience and avoiding misinterpretation requires "sharpening up". I find that blog writing has been of the most personal value to me in my academic journey. It requires me to select an issue from a myriad of conflicting ideas swarming into my mind, appreciate the word limit as an opportunity to edit irrelevance and focus on what I really want to say, questioning myself before others question, avoiding assumptions.

In appreciating this process, I am reminded of our series of blogs around Artificial Intelligence (AI), mentioned by Jonathan here, and how fans of ChatGPT extol its virtues as a timesaver, removing effort and tedium from the drafting process (see the discussion by Daher, 2023). What seems then to be considered tedious by some is, for me, a vital process of my communication with an audience that dialogic engagement that consumes time and effort seems an essential part of the pedagogic journey of academic writing, the "sharpening up", for which blogging offers an ideal opportunity.

Dr Fearn: The Transformative Potential of Digital Tools in Educational Contexts

As an academic and educator, I must use innovative approaches in my practice and research. The effectiveness of

short blog posts in stimulating language acquisition among teenagers has been evident to me for some time, and I use them regularly in my practice (Fearn, 2021b). However, it was not until I completed my Doctor of Education (EdD) that I recognised the substantial benefits of academic blogging. Blogging has strengthened my scholarly writing skills and assisted in developing an academic voice. Therefore, I will use my first blog: 'Academia through the lens of a secondary school teacher' (Fearn, 2021a), to explore the transformative potential of academic blog writing in adult education from an adult learner's perspective.

Analytic autoethnography is used to understand the transformative potential of blog writing as a cultural phenomenon (Poulos, 2021). My first blog is considered through four themes adapted from Mezirow & Taylor's (2011) theory on TL Concern, Self-Reflection, Direction, and Reconstruction (Figure 1).

Themes	Description (adapted from Mezirow & Taylor, 2011)
Concern	Experience a challenging event that disrupts existing beliefs or perspectives.
Self-Reflection	Assess and question assumptions.
Direction	Investigate new directions.
Reconstruction	Apply transformed perspectives and behaviours.

Figure 1: Themes.

Concern

'Combining theory and practice would be ideal for research, but in reality, combining the two presents a myriad of problems' (Fearn, 2021a).

The primary concern in this first blog (and subsequent blogs) is the difficulty transitioning from a practitioner to a researcher. Indeed, it is a significant problem in adult education (Padwad, 2018), particularly in professional doctorates such as the EdD (Fearn, 2022a). Identifying a dilemma is the first step in TL. Afterwards, adults reflect upon social, cultural, and historical influences and reconsider their worldviews to understand the problem (Mezirow & Taylor, 2011).

Self-Reflection

'My transition into academia was challenging because of a long career in teaching in secondary schools.' (Fearn, 2021a).

Reflecting on my academic journey revealed the source of my difficulties: I was thinking as a teacher and not an academic. This awareness suggests that blog writing is an excellent platform for TLT, enabling critical reflection and self-analysis (Howie & Bagnall, 2013). Indeed, originally simple online diaries, blogs have evolved into sophisticated platforms that can facilitate perspective shifts aligned with TL, encouraging the exploration of personal and social contexts (Hammond, 2016).

Direction

'I can now see that Action Research (AR) has been critical in my EdD journey as a researcher, guiding me in the correct direction for each mistake I made (and there were many).' (Fearn, 2021a).

The discovery of Action Research provided a new direction for my research. This breakthrough was recognised because I used the blog to situate my subjective experiences within broader social contexts (Hammond, 2016). Blogging increases awareness of the outside world by encouraging the integration of multimedia resources and fosters engagement within the academic community (Morris et al., 2019).

Reconstruction

'Measures included changing research questions, discarding unnecessary data, and even changing the method of data analysis from a case study to a multiple case study towards the end of the study.' (Fearn, 2021a).

I implemented new perspectives and directions, such as modifying research questions and data analysis methods. These modifications underline the potential of blogging for enhancing academic rigour and personal voice (Morris et al., 2019). Additionally, they provide an authentic platform where students can develop an individual voice and locate themselves as knowledgeable beings within their fields. (Morris et al., 2019).

In conclusion, this section briefly outlines the value of blogging as a transformative tool in adult education. Blogs offer a reflective and communal space that challenges and reshapes educators' and learners' beliefs, bridging theory and practice effectively. Through blogging, the theoretical underpinnings of education become dynamic, lived experiences that have the potential to facilitate genuine learning and engagement.

Dr. Hughes: The Value of Blogs in Fostering Student Engagement, Empowerment, and Skill Enhancement

As an 'entry point' to this study, I have attempted a blog based on my previous contribution to reflect on the implications for student engagement, empowerment and skills enhancement.

In November 2023, I blogged, "AI - What's all the fuss about?" (Hughes, 2023). It outlined my very first steps with Chat GPT. I then referred to an article by Philip Ball, "Can IT Think?" (Ball, 2023), which concludes that AI should be licensed for public use only after careful testing.

I have not engaged with ChatGPT since. However, contributing to that blog made me notice various articles about AI, including O'Reilly et al. (2024). They point out, "Time and time again, leading scientists, technologists and philosophers have made spectacularly terrible guesses about the direction of innovation" (O'Reilly et al., 2024, para. 1). These guesses include Albert Einstein predicting that nuclear energy would never be possible just ten years before Fermi completed the construction of the first fission reactor.

O'Reilly et al. (2024). suggest broad agreement with David Collingridge's thesis that predicting the impact of new technologies is a fool's errand (as discussed by O'Reilly et al., as cited in Genus & Stirling, 2018). They also agree with Collingwood that technology evolves in uncertain ways but, critically, go on to suggest that there is one form of AI risk that is, in their words, generally knowable in advance, namely, risks stemming from misalignment between a company's economic incentives to profit from its proprietary AI model in a particular way and society's interests in how the AI model should be monetised deployed.

The article then considers in some detail the algorithmic technology that underpins platforms like Amazon, Google and Facebook and argues that these were ' initially deployed to benefit users' but that they have since been 're-programmed to increase profit' (O'Reilly et al., 2024, para.10). They use the concept of 'rent', defining it as a pure return stemming from ownership or some degree of monopoly power in contrast to a return produced by selling something in a competitive market.

O'Reilly et al. (2024) continue their argument about the necessity of seeing this technological issue in social and economic terms by suggesting possible responses derived from how society organises itself. In this sense, they occupy a similar territory to Philip Ball's (2023): his suggestion of testing before release implies that society produces a coherent response rather than leaving it to the individual consumer.

Student engagement, empowerment and skills enhancement

Writing the blog took me just over an hour, but I think it was an hour well spent as it was an opportunity to think again about the topic of AI. But in doing so, it also had other implications. In particular, it has highlighted the importance of thinking like a social scientist regarding any technology issue in actual social contexts. It also highlights how ideas like 'rent' (from economics) (O'Reilly et al., 2024, para. 12) can clarify thinking.

I have been thinking for some time that this is particularly important for the WELS postgraduate researchers, especially those from a science or technology background.

So, I would encourage all PG Researchers to spend an hour or so writing a blog or responding to one; you will be surprised by the return you get from a relatively limited investment.

Conclusion

The diverse reflections and discussions presented in this paper stress the impact of blogging on the landscape of HE. The personal and analytical explorations of four academic bloggers reveal insiders' perspectives on how blogs serve as platforms for enhancing pedagogy, fostering community, and promoting inclusive dialogues within academic settings. They show how blogs can be transformative spaces where educational theories and practices intersect while challenging traditional boundaries and encouraging a deeper engagement with learning materials.

This autoethnographic journey reveals that blogs do more than disseminate knowledge; they create communities of practice that extend beyond geographical and institutional confines. Blogs empower students and educators by breaking down the barriers of the traditional academic hierarchy. They facilitate an exploration of inclusive and expansive ideas and contemporary concerns such as AI and the complexities and ethical considerations of integrating new technologies into educational contexts. Therefore, they encourage educators and students to think broadly about the implications of digital tools in learning environments.

In conclusion, this paper highlights the potential of blogs to act as catalysts for change, advocating for a more open, reflective, and engaged academic community. This digital medium reminds us that the education journey is ever-evolving and rich with opportunities for dialogue, growth, and transformation. Nevertheless, as Dennis noted in the first section of this paper, it is impossible to justify blogging in educational settings in so few words. However, this paper does not claim to do that. It aimed to provide a reflective insight into the possibilities blogging can lend to teachers and learners in education, particularly in HE.

References

Anderson, L. (2006). Analytic Autoethnography. *Journal of Contemporary Ethnography,* 35(4), 373–395. https://doi.org/10.1177/0891241605280449

Bakhtin, M. M. (1981). Discourse in the novel. In M. Holquist (Ed.), *The dialogic imagination: Four essays by M. M. Bakhtin*

(pp. 259-422). University of Texas Press. (Original work published 1934/1935)

Ball, P. (2023, Summer). Can it think? Prospect Magazine. Retrieved from https://pocketmags.com/prospect-magazine/summer-2023/articles/1340444/can-it-think

Cobb, J. (2023, December 7). AI for academic writing: To plagiarise or not to plagiarise. Postgraduate and Early Career Researchers' Blog: Scholarly Conversations. Open University. https://www.open.ac.uk/blogs/welspgr/index.php/2023/12/07/ai-for-academic-writing-to-plagiarise-or-not-to-plagiarise/

Cobb, J. (2024, May 21). Defending my work or being defensive? Postgraduate and Early Career Researchers' Blog: Scholarly Conversations. Open University.

Cohen, S. (2011). *Folk devils and moral panics.* Routledge.

Daher, R. S. (2023). Will ChatGPT be the disrupter academia needs? The Conversation. Retrieved May 6, 2024, from https://theconversation.com/will-chatgpt-be-the-disrupter-academia-needs-200215

Duarte, P. (2016). The use of a group blog to actively support learning activities. *Active Learning in Higher Education,* 16(2), 103–117.

Ellis, C., Adams, T. E., & Bochner, A. P. (2011). Autoethnography: An overview [40 paragraphs]. *Forum Qualitative Sozialforschung* / Forum: Qualitative Social Research, 12(1), Article 10. http://nbn-resolving.de/urn:nbn:de:0114-fqs1101108

Farmer, B., Yue, A., & Brooks, C. (2008). Using blogging for higher order learning in large cohort university teaching: A case study. *Australasian Journal of Educational Technology,* 24(2), 123–136.

Fearn, L. J. (2021a, November 30). Academia through the lens of a secondary school teacher. Open University. https://www.open.ac.uk/blogs/welspgr/index.php/2021/11/30/academia-through-the-lens-of-a-secondary-school-teacher/

Fearn, L. J. (2021b). *An Enquiry into English as a Foreign Language and Online Community Projects in Secondary School Education.* The Open University.

Fearn, L. J. (2022a). Inside(r) Looking Out. ETAS, 8(1), 8.

Fearn, L. J. (2022b). Online Community Projects and Post-Pandemic EFL Curricula in Secondary-Schools. In W. M. L-Henawy & M. del M. Suárez (Eds.), *English as a Foreign Language in a New-Found Post-Pandemic World*. (p.p.226 – 249) IGI Global. https://doi.org/10.4018/978-1-6684-4205-0

Genus, A., & Stirling, A. (2018). Collingridge and the dilemma of control: Towards responsible and accountable innovation. Research Policy, 47(1), 61-69. https://doi.org/10.1016/j.respol.2017.09.012

Halasek, K. (1999) *A pedagogy of possibility: Bakhtinian Perspectives on Composition Studies*, USA: Southern Illinois University Press

Hammond, M. (2016). How ideas of transformative learning can inform academic blogging. *International Journal for Transformative Research*, 3(1), 33–40. https://doi.org/10.1515/ijtr-2016-0006

Howie, P., & Bagnall, R. (2013). A beautiful metaphor: transformative learning theory. *International Journal of Lifelong Education,* 32(6), 816–836. https://doi.org/10.1080/02601370.2013.817486

Hughes, J. (2023 November 6). AI: What's all the fuss about? Postgraduate and Early Career Researchers' Blog: Scholarly Conversations. Open University. https://www.open.ac.uk/blogs/welspgr/index.php/2023/11/06/ai-whats-all-the-fuss-about/

Lai, K., & Hong, K. (2015). Technology use and learning characteristics of students in higher education: Do generational differences exist? *British Journal of Educational Technology*, 46(4), 725–738.

Mezirow, J., & Taylor, E. W. (2011). *Transformative learning in practice: insights from community, workplace, and higher education.* John Wiley & Sons.

Morris, N. J., Christie, H., & Barber, J. (2019). 'It's one of the first times I've felt fully engaged': developing student engagement using blogging as a form of assessment. *Journal of Geography in Higher Education*, 43(3), 343–361. https://doi.org/10.1080/03098265.2019.1612862

O'Donovan, B.; Rust, C; Price, M. (2016) A scholarly approach to solving the feedback dilemma in practice. *Assessment & Evaluation in Higher Education*, 41(6), 938-949

Open University. (n.d.). Postgraduate and Early Career Researchers' Blog: Scholarly Conversations. Retrieved 05/05/2024 from https://www.open.ac.uk/blogs/welspgr/

O'Reilly, T., Strauss, L., Mazzucato, M., & Rock, R. (2024, April). To understand the risks posed by AI, follow the money. The Conversation. https://theconversation.com/to-understand-the-risks-posed-by-ai-follow-the-money-225872

Padwad, A. (2018). Supporting teacher-researchers: Some issues. In D. Xerri & C. Pioquinto (Eds.), *Becoming Research Literate Supporting Teacher Research in English Language Teaching* (pp. 46–61).

Pölönen, P. (2021). Future skills. New Jersey: Viva Editions.

Poulos, C. N. (2021). *Essentials of Autoethnography*. American Psychological Association.

Rogoff, B., Coppens, A. D., Alcalá, L., Aceves-Azuara, I., Ruvalcaba, O., López, A., & Dayton, A. (2017). Noticing Learners' Strengths Through Cultural Research. *Perspectives on Psychological Science*, *12*(5), 876–888. https://doi.org/10.1177/1745691617718355

Sadowski, Jathan (2021) I'm a Luddite. You should be one too, T*he Conversation,* 25 accessed May 7 2024

Wall, S. S. (2016). Toward a Moderate Autoethnography. *International Journal of Qualitative Methods*, *15*(1),https://doi.org/10.1177/1609406916674966

Optimizing Cross-Institutional Studies

Cross-institutional studies entering a new phase

Teija Lehto and Elisa Rantanen

Tampere University of Applied Sciences

Abstract

Cross-institutional studies between higher education institutions have been administrated in Finland through different external portals for more than twenty years. Processes in external portals including various enrollment forms have caused a lot of manual work for the university staff and students. Currently the administration process of cross-institutional studies is becoming significantly easier, as the **Cross-Institutional Study Information Service** (CISIS) was introduced in 2023. Both students and staff can use the study information systems in their home universities to manage the cross-institutional studies. The CISIS provides a standardized way for the Finnish universities and universities of applied sciences to offer their courses, transfer enrollments and performance data between higher education institutions nationally without external portals or websites.

Keywords: *cross-study, higher education, information system, cross-institutional*

Background to domestic cross-institutional studies

In Finland cross-institutional studies give higher education students an opportunity to study flexibly at another university or university of applied sciences (UAS). Cross-institutional studies are also often referred to as domestic student mobility, or simply “cross-studies”.

Traditionally, cross-institutional courses to Finnish students in higher education have been offered on various external portals. In 2003–2016, the Study Services system of the Finnish Online University of Applied Sciences was functioning with Tampere University of Applied Sciences (TAMK) as the coordinator. Since 2017, the CampusOnline.fi website of the Finnish UASs has been in use. The Tampere Universities’ Community has a joint cross-institutional study offering website between the Tampere University, TAMK and the Police University College (Tampere Higher Education Cross-Institutional Studies 2024).

What these examples, and any other cross-institutional national study services have in common is that both students and university staff have to manage the functions and processes in external portals, through various registration forms, and the amount of manual work accumulates for all the participants.

Cross-Institutional Study Information Service

The Cross-Institutional Study Information Service (CISIS) was introduced in 2023 (CSC 2024). It offers the technology for the Finnish universities and UASs to share their course offerings and transmit enrollment and performance data between the institutions. The service is integrated into the proprietary study information systems of the institutions. Both students and staff utilize the CISIS via their respective study information systems (currently “Peppi” and “Sisu”). This approach allows users to operate within a familiar environment in their home universities, eliminating the need to access an external service.

The technical execution of the data exchange layer is administered by CSC - IT Center for Science Ltd. Figure 1 illustrates the data flows associated with the service. Dataflows include network information, courses provided by institutions within the networks, registrations and study attainments.

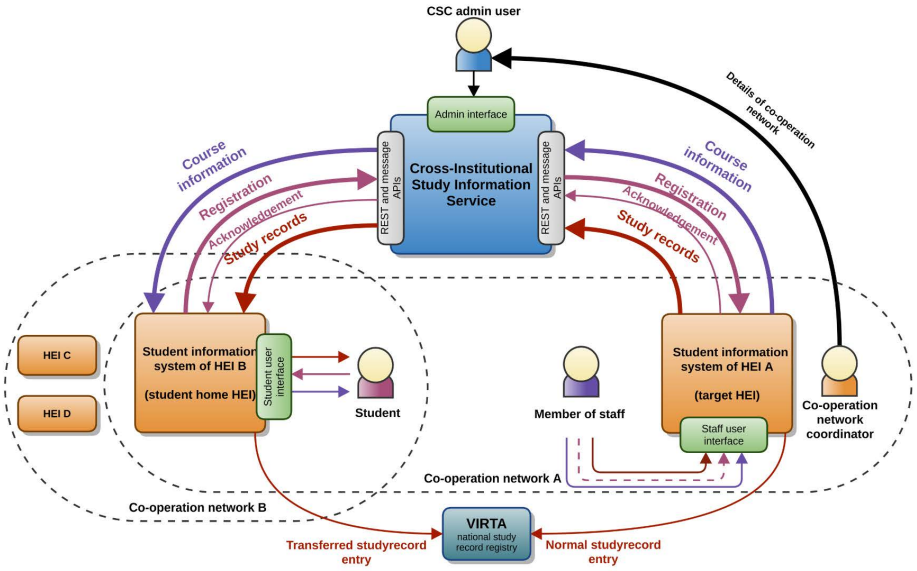


Figure 1: The data flows in the Cross-Institutional Study Information Service (CISIS). (CSC 2024).

Collaboration network agreement is a prerequisite

The CISIS enables mobility within different networks. Consequently, it is rather useless for the universities to join CISIS, unless they also join the collaboration networks serving their educational strategies. Agreements are an essential part of the functional entity, because in the CISIS virtual mobility only takes place inside the networks. Although CISIS does not technically enable studies across network borders, a university can offer the same studies to several networks.

The procedure of network collaboration agreements consists of two phases. First the institution joins a **framework agreement** signed by a large number of Finnish higher education institutions. In the second phase the **network-specific agreement** is created and signed based on a common document template. The framework agreement helps keeping the network-specific agreements fairly short and tidy, as the network-specific agreements make a reference to the framework agreement. (Opetusyhteistyöhön liittyvät sopimukset 2024.)

TAMK joined the CISIS in December 2023 and is currently involved in two CISIS networks: **CampusOnline UAS Bachelor's Level** , **CampusOnline UAS Master's Level.** At the time of writing this article, 14 Finnish UASs out of total 24 are members of these networks. Nationally, there are 29 CISIS higher education networks in operation.

New cross-institutional functions in the study information system

When offering studies to a CISIS network, special attention should be paid to the details of the course description in the home university's study information system. All dataflows from one university to another are automated, as illustrated above in figure 1. It is sometimes challenging for the teachers to take the target university's point of view, and realize that the students of the target university will only get the information recorded in the host university's system. Basic information like field of study, credits, timing, language, methods, learning outcomes, prerequisites, learning platforms, evaluation criteria and scale are important information for all students.

Course information must be presented in accordance with the network agreement in question. For example, in the CampusOnline UAS networks only 100 % online studies may be offered. Blended or contact studies may be offered in some other networks.

The teacher or study coordinator adds a quota group for cross-institutional students in the course implementation details according to what has been agreed in their degree programme. Figure 2 shows a situation where a quota group has already been added. Once the course implementation is published, a green notification appears indicating that the course details have been transferred through CISIS, and they are available in the study information systems of all the target universities. Subsequently, students from the target universities in the network are eligible and able to register for the course.

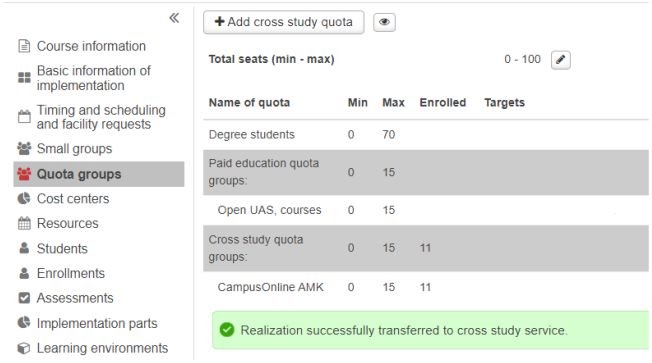


Figure 2: View of a course implementation where the teacher has added a quota of 15 students for cross-institutional studies to the CampusOnline UAS network in TAMK's study administration system "Peppi".

Student's desktop

The students will see different, personalized cross-institutional offerings depending on which network studies each student is entitled to. Students may have the right to enroll for studies in several networks. In Finland the study administration system "Peppi" is widely used, and we use it as an example in this context.

The teacher in the host institution either rejects or accepts an incoming cross-institutional student's enrollment the same way as enrollments coming from their home university. A student accepted for the course will receive instructions from the host insitution by email. When the student completes the course in accordance with the regulations of the host institution, the grade is automatically transferred through CISIS to student's home university system. Subsequently, the student's home university can decide how to locate the attained course and credits in the student's personal study plan.

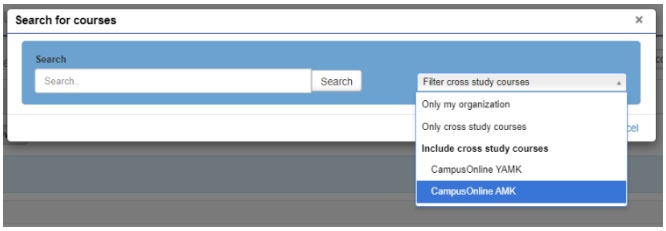


Figure 3: In the study administration system "Peppi" or "Pakki", students can filter cross-institutional study offerings by network.

Conclusion

Cross-institutional studies are a way to offer more diverse learning opportunities to the degree students in higher education. They allow students to enrol for studies that are not available to them in their home university. On the national level, cross-institutional studies have all the potential to minimize redundancy in course offerings between higher education institutions and optimize the utilization of educational resources.

The introduction in 2023 of Cross-Institutional Study Information Service (CISIS) has increasingly been facilitating inter-institutional management of academic studies in Finland. However, there are still challenges to be met in the future. The procedures and workload of writing and ratifying agreements is one of them. In the current situation universities of applied sciences in Finland have a cross-institutional framework agreement, network agreements for each network, university-based maintenance agreements with the service providers and personal data policies.

Cross-institutional studies have certainly been practiced in one way or other in several European countries, not only in Finland. Institutional barriers have been broken, technical and process problems have been solved, and currently a few more problems concerning different information systems and data models are being solved. At this stage we can ask: would it be possible to have this kind of service in Europe? What could be the future of a European Cross-Institutional Study Information Service? Would it be an opportunity or a risk?

References

CSC (2024). Cross-Institutional Study Information Service for Higher Education. Eduuni wiki page by CSC - IT Center For Science LTD. Retrieved May 14, 2024, from https://wiki.eduuni.fi/display/Ristiinopiskelupalvelu/In+English

Opetusyhteistyöhön liittyvät sopimukset (2024). Eduuni wiki page maintained by CSC - IT Center For Science LTD. Retrieved May 14, 2024, from https://wiki.eduuni.fi/pages/viewpage.action?pageId=218702942

Tampere Higher Education Cross-Institutional Studies. (2024). Tampere Universities' Community. Retrieved May 14, 2024, from https://ristiinopiskelu.tuni.fi/?uiLang=en

Innovating Skills and Competencies

Advancing Engineering Education and Industry 4.0: Development of Remote Laboratories and IoT Platform for Practical Skills Acquisition

Sergio Martin[1] and Antonio Robles-Gómez[2]

[1] Universidad Nacional de Educación a Distancia (UNED). UNESCO Chair on Distance Education.
[2] Universidad Nacional de Educación a Distancia (UNED).

Abstract

The fourth industrial revolution has triggered a huge educational challenge where educational institutions have not only need to train the 2.76 million current European engineering students, but the need to re-train employees in a sector that involves more than 2 million companies and 33 million jobs at European level through on-line education. This article introduces the IN4LABS project, which aims to accelerate the industry digital transition by designing a platform to easily deploy open remote laboratories. These remote labs facilitate on-line practical skills acquisition for students and professionals in fields like Internet of Things, Artificial Intelligence, cybersecurity, robotics, and big data analysis. The project's innovative approach allows for remote experimentation and learning, overcoming traditional barriers of time and space. Ultimately, IN4LABS seeks to drive economic growth by fostering the adoption of Industry 4.0 technologies across various sectors and regions.

Keywords: *remote laboratory, industry 4.0, on-line learning*

Introduction

The "Industry 4.0" paradigm has presented a wealth of new opportunities and challenges for businesses. The digital transformation of production and logistics chains, as well as product development, is essential for enhancing competitiveness and efficiency. This shift has been enabled by the concurrent development of new technologies such as Big Data, IoT, Cloud Computing, and Artificial Intelligence (Tao et al, 2018) (Thoben et al, 2017) (Wang et al, 2016). Other key innovations include the integration of horizontal and vertical software, cybersecurity, digital twins, and advanced robotics (Frank, 2019) (Benotsmane, 2019).

The fourth industrial revolution has also posed a significant educational challenge. There is a need to educate not only the current 2.76 million engineering students in Europe but also to upskill employees within a sector encompassing over 2 million companies and 33 million jobs across the continent. While students may learn through traditional education, employees are likely to need online resources to refresh their knowledge and skills. However, ensuring the acquisition of high-quality practical online skills in engineering is extremely challenging. Traditionally, simulators have been commonplace in engineering education, but more recently, virtual and remote laboratories have offered flexibility in learning time and space (Ruiz, 2014).

The IN4LABS project aims to accelerate the digital transition of engineering education and industry towards Industry 4.0. Its primary contributions are the development of a platform to facilitate the creation of remote laboratories for Industry 4.0 and the establishment and assessment of remote labs for various Industry 4.0 technologies. The source code and hardware designs for the platform and these labs will be made publicly available.

The following details our general proposal and some of the progress already achieved within the IN4LABS project.

Proposal

The acquisition of practical skills is crucial in engineering education, but it's not always feasible to accomplish this in

person. Remote laboratories (Martin et al, 2021), essentially real hardware that is remotely accessible via a web interface, provide flexibility in the learning process for students who are remote or employing a hybrid learning methodology. Our main objective is to hasten the digital education transition toward Industry 4.0. Specifically, we propose:

- Developing an open-source IoT platform to support and ease the development of remote laboratories.
- Deploying a suite of remote Industry 4.0 laboratories.
- Piloting these remote labs with the developed infrastructure.
- Promoting international cooperation with technical associations, companies, and institutions interested in Industry 4.0.

The defined set of laboratories includes:

- IoT Laboratory: Development of a remote lab with Arduino-compatible boards that can wirelessly interconnect, allowing remote practice development.
- Sensor Laboratory: Experimentation with various IoT sensors, such as gas, smoke, temperature, humidity, and pressure sensors, programmable remotely by students.
- Cybersecurity Laboratory: Utilizing remote IoT infrastructure to develop cybersecurity practices, including encrypted communication and defense against attacks like Man-in-the-Middle, buffer overflow, and denial of service.
- System Integration Laboratory: Using remote IoT infrastructure for system integration with NodeRED, a programming tool that connects hardware devices, APIs, and online services.
- Robotics Laboratory: Programming interconnected robotic systems remotely through IoT infrastructure with added robotic servos.
- Big Data Laboratory: Adding a Big Data platform to the IoT system to perform data analysis, enabling students to create dashboards with IoT data.
- Cloud Laboratory: Allowing students to practice remotely by connecting an IoT system to a cloud provider.
- Artificial Intelligence Laboratory: Facilitating machine learning practices through a high-performance server.

The IoT platform or infrastructure supporting these labs is designed for remote access through custom software, as shown in Figure 1. It's built upon Arduino-based lab software previously used for other types of remote labs.

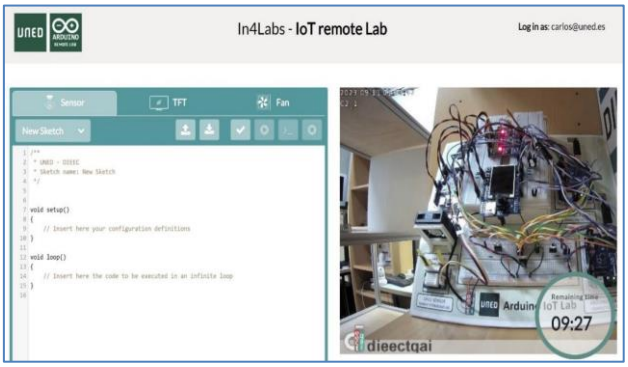


Figure 1. Remote IoT laboratory interface (code panel and webcam view).

The educational software interface allows users to experiment with Arduino boards and observe them in various scenarios, promoting an understanding of potential vulnerabilities and mitigation strategies. It enables users to send code over the Internet for execution on the Arduino boards and monitor changes through a connected webcam.

Access to the IoT lab requires students to book a time slot in the remote IoT lab reservation system, as shown in Figure 2.

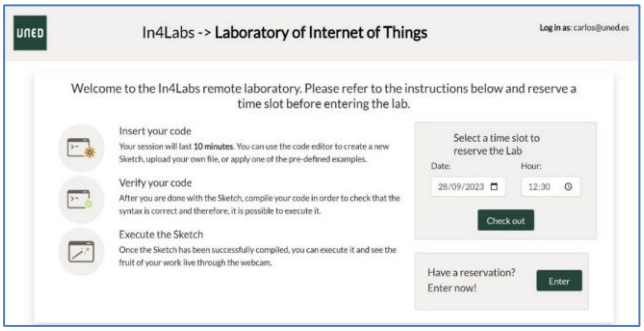


Figure 2. Remote laboratory reservation system interface.

For experiments related to Artificial Intelligence and Big Data topics, a high-performance server with multiple GPUs has been acquired for advanced experiments.

Discussion and Conclusions

The impact of the fourth industrial revolution is immense, with Industry 4.0 potentially contributing to annual efficiency gains in manufacturing between 6% and 8%. Hence, the outcomes of the IN4LABS project will have a significant economic impact: speeding up the digital transition to Industry 4.0 and substantially reducing the development costs of online laboratories. It's estimated that implementing our remote Industry 4.0 laboratories in other institutions by other researchers could take as little as two hours per lab for complete software and hardware setup, as opposed to several months. This massive saving in development time directly translates into cost savings. Considering this substantial reduction in developer hours.

Acknowledgements

This publication is part of the In4Labs project with reference TED2021-131535B-I00 funded by MICIU/AEI/10.13039/501100011033 and by ``European Union NextGenerationEU/PRTR''. Authors also acknowledge the support provided by the UNESCO Chair on Distance Education (CUED).

References

Tao FC, J Q, Q, Zhang M. Digital twin-driven product design, manufacturing and service with big data. The International Journal of Advanced Manufacturing Technology. 2018;94:3563-76. https://doi.org/10.1007/s00170-017-0233-1

Thoben KD, Wiesner S, Wuest T. Industrie 4.0" and smart manufacturing-a review of research issues and application examples. International journal of automation technology. 2017;11(1):4-16. https://doi.org/10.20965/ijat 2017.p0004

Wang S, Wan J, Zhang D, Li D, Zhang C. Towards smart factory for industry 4.0: a self-organized multi-agent system with big data-based feedback and coordination. Computer networks. 2016;101:158-68. https://doi.org/10.1016/j.comnet.2015.12.017

Frank AG, Dalenogare LS, Ayala NF. Industry 4.0 technologies: Implementation patterns in manufacturing companies. International journal of production economics. 2019;210:15-26. https://doi.org/10.1016/j.ijpe.2019.01.004

Benotsmane R, Kovács G, Dudás L. Economic, social impacts and operation of smart factories in Industry 4.0 focusing on simulation and artificial intelligence of collaborating robots. Social Sciences. 2019;8(5):143. https://doi.org/10.3390/socsci8050143

Ruiz ES, Martin AP, Orduna P, Martin S, Gil R, Larrocha ER, et al. Virtual and remote industrial laboratory: Integration in learning management systems. IEEE Industrial Electronics Magazine. 2014;8(4):45-58. https://doi.org/10.1109/MIE.2012.2235530

Martin S, Fernandez-Pacheco A, Ruipérez-Valiente JA, Carro G, Castro M. Remote Experimentation Through Arduino-Based Remote Laboratories. IEEE Revista Iberoamericana de Tecnologías del Aprendizaje. 2021;16(2):180-186. https://doi.org/10.1109/RITA.2021.30899166.

Issues for contextualising competencies for sustainable development in higher education institutions

Andy Lane

The Open University, UK

Abstract

UNESCO has set out eight competencies for sustainable development that they would like all graduates to have to help meet the Sustainable Development Goals. How higher education institutions interpret and integrate these competencies into their own policies and practices will depend on the influence of their social, cultural, economic, and environmental context. This article looks at the many issues involved in this process by comparing the situations in the United Kingdom and in Myanmar.

Keywords: *competencies, sustainable development, higher education institutions*

Introduction

The Brundtland report (Brundtland et al., 1987) was the first global milestone for defining sustainable development (SD), raising worldwide concerns about the impact of human activities. This was followed by the first United Nations (UN) Conference on Sustainable Development in 1992 which agreed on Agenda 21 as the first in a series of international commitments on sustainable development as part of a global partnership (United Nations, 1992). These conferences stimulated a wide range of initiatives and activities including in higher education institutions (HEIs) as they researched what education for sustainable development (ESD) should cover and how it might be taught. However, the most notable declarations in this area are the UN Sustainable Development Goals (SDGs).

The 17 UN SDGs (see Figure 1) cover many topics but the role of education is specifically set out in SDG 4:

'Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all' (United Nations, 2015).

And amongst ten different targets under SDG 4, SD specifically features in target 4.7, commonly known as ESD, which states:

> *'By 2030, ensure all learners acquire knowledge and skills needed to promote sustainable development, including among others through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship, and appreciation of cultural diversity and of culture's contribution to sustainable development'* (United Nations, 2015).

Figure 1: The 17 SDGs

Sustainability competencies and graduate attributes

When the SDGs were agreed there were still questions as to what ESD covers – particularly what attributes graduates from HEIs should be expected to demonstrate. The determination of a widely agreed set of graduate attributes for ESD has come about through various routes and developments. The national and international discussions happening about ESD and the inclusion of ESD as part of the SDGs has also led to the United Nations Educational, Scientific and Cultural Organization (UNESCO) developing a set of eight ESD competencies for graduates that HEIs can use as a guide. UNESCO's eight competencies are categorised into three domains: cognitive (for knowledge); socio-emotional (for attitudes and values); and behavioural (for skills) (UNESCO, 2017a). These UNESCO competencies for ESD have been slightly adapted by the United Kingdom's Quality Assurance Agency (QAA) and Advance HE (QAA and Advance HE, 2021) by using different terminologies for the three domains - ways of thinking (cognitive), ways of being (socio-emotional) and ways of practicing (behavioural) (see Table 1).

	Competency	Students who display this competency can	
Subject Knowledge and Knowledge of All SDGs	Systems thinking	recognize and understand relationships; analyze complex situations; consider how systems are embedded within different domains and scales; and deal with uncertainty.	Ways of thinking
	Anticipatory	understand and evaluate multiple futures; create their own visions for the future; apply the precautionary principle; assess the consequences of actions; and deal with risks and changes.	
	Critical thinking	question norms, practices, and opinions; reflect on own one's values, perceptions, and actions; and take a position in the sustainability discourse.	
	Strategic	develop and implement innovative actions that further sustainable development at the local level and further afield.	Ways of practicing
	Collaboration	learn from others (including peers, and others from inside and outside of their institutions); understand and respect the needs, perspectives, and actions of others; deal with conflicts in a group; and facilitate collaborative and participatory problem solving.	
	Integrated problem-solving	apply different problem-solving frameworks to complex sustainability problems; develop viable, inclusive, and equitable solution options; and utilize appropriate competences to solve problems.	
	Self-awareness	reflect on their own values, perceptions, and actions; reflect on their own role in the local community and the global society; continually evaluate and further motivate their actions; and deal with their feelings and desires.	Ways of being
	Normative	understand and reflect on the norms and values that underlie one's actions; negotiate sustainability values, principles, goals, and targets, in a context of conflicts of interests and trade-offs, uncertain knowledge and contradictions.	

Table 1 QAA and Advance HE adaptation of UNESCO's ESD competency framework (QAA and Advance HE, 2021, p. 20).

UNESCO uses the term competencies which are defined as the desired knowledge, skills, and behaviors of a student graduating from a programme of study that enable them to successfully perform in professional, educational, and other life contexts. Others talk about graduate attributes which are defined as the high level qualities, skills and understandings that a student should gain as a result of the learning and experiences they engage with, while at university.

Contextualising competencies for HEIs

The determination of a global set of competencies/graduate attributes for ESD has come about through various routes and developments. The UNESCO competencies were developed by authors from Europe and reviewed by scholars and experts from different countries (UNESCO, 2017). They were reportedly informed by the concepts and models from three articles: one of which discussed 12 sub-competencies of design skills (de Haan, 2010), key sustainability competencies based on the existing literature (Wiek, Withycombe and Redman, 2011), and the key ESD competencies from the perspectives of senior members in higher education, NGOs and public administration (Rieckmann, 2012). As has been noted, the UK has largely adopted this UNESCO set of competencies into guidance for all its HEIs and many of those HEIs are now in the process of implementing this guidance. Even so there is not much elaboration on how to interpret the different competencies in practice and how they might inter-relate nor whether their categorisation against the three domains is appropriate.

The UK has a long history of research and development relating to ESD, some of which will probably have informed the UNESCO process. Other countries lack such a history and also do not have similar cultural or socio-economic histories. An alternative approach to determining appropriate graduate attributes for different contexts may therefore be needed. One such contextualised approach has recently been undertaken for Myanmar (Lwin et al, 2024).

Myanmar gained its independence from the British Empire in 1948 and encountered a chaotic political situation and civil unrest for 14 years before being ruled by the military for 48 years. A new political system, known as a quasi-democratic system, began in 2010 and initiated some educational reforms. When the National League for Democracy (NLD) won the election in 2015 the education reform process was escalated. The subsequent election was won in a landslide by the NLD party in November 2020. However, in February 2021, the military seized power from the civilian government and thus both SD and education reform processes have been disrupted since then. Thus, there has been no explicit national drive to integrate ESD in HEIs in Myanmar and there was a lack of evidence on how ESD is viewed in Myanmar.

There were two interrelated approaches used to develop and define possible lists of graduate attributes relevant to Myanmar's future sustainability. First, an initial list of graduate attributes emerged from the systematic analysis of qualitative data acquired through seven interviews with experienced professionals from different backgrounds and two Focus Group Discussions with university teachers and students from Myanmar. This produced fourteen graduate attributes (Table 2).

Graduate Attributes	*Descriptors*
Social abilities	Being reflexive and open-minded for feedback; Social dealing skills e.g., interpersonal communication, negotiation, conflict resolution, and being able to build social networks; Having teamwork skills e.g., being collaborative, adaptable, flexible, and confident to discuss, question or debate
Cultural sensitivity	Being knowledgeable about human rights, equality, social conflicts, different cultures/ values/ beliefs/ traditions, psychology, and country's context; Having basic awareness on peace, respect rights/ freedom of minority/ marginalised identities (e.g., LGBT, minority ethnic/religious/disable groups); Ability to think of being inclusive, work in multi-cultural contexts, and adapt to new cultural contexts
Management skill	Being reliable; Having accountability and responsibility skills; Having problem solving skills and facilitation skills to address the issues; Being able to organise activities or projects and being competent in time management, resource management, project, and/or business management
Environmental literacy	Having basic environmental knowledge (e.g., ecology, biodiversity, symbiotic relationships, climate change, deforestation, etc.) and sustainability concepts; Understand basic principles of sustainability in environmental and resources management, and the interdependence of human beings and ecosystems; Having value, respect, and love for the natural environment, and Ability to think of future impact and act and apply environmentally sound management practices in their activities
Thinking proficiency	Being good in reasoning, logical thinking, analytical and critical thinking, and creative thinking, leading to wisdom
Language proficiency	Proficiency in English language skills (at least communicable), Myanmar language; Ability to use any ethnic or foreign languages depending on the situation and individuals' preferences.
Work experience	Having work experience in the job environment, or research field or communities (such as internship or volunteer) during study programmes
Digital literacy	Ability to use a computer and commonly used software such as Office software (Microsoft Office: word, excel, PowerPoint etc.,); Ability to use internet, search data and apply communication software such as Skype/ Zoom etc., including social media
Personal abilities	Having self-awareness, moral conduct, contentment, self-esteem, altruism, compassion, and sympathy; Being curious and open-minded to learn, being motivated to learn from work/ experience, and able to learn independently; Being able to read and write well (e.g., proposals/ reports/ research papers)
Researching	Having fundamental research knowledge and skills
Entrepreneurship	Having skills and enthusiasm to create/ initiate innovative projects/business
Teaching	Ability to teach or to transfer knowledge to others
Professionalism	Being professionally ethical, having respect to one's own profession and others; Being punctual and honest; Knowing one's own rights as well as being responsible
Resilience	Having perseverance, grit, adaptability, and commitment; Having a good focus/ attention on what one is studying or working on; Ability to overcome problems and hardship

Table 2 Graduate attributes and descriptors derived from the qualitative data (Lwin et al, 2024)

Secondly, these 14 attributes were then tested for their relative importance using an online survey with a large number of over 400 Myanmar graduates. Statistical tests on the data showed that the majority of the respondents in the survey perceived all the graduate attributes to be important and above the mid-point scale, although there were a few outliers with a slightly lower priority. This trend of high priority for nearly all attributes was similar when other respondents were asked to rank the attributes by both importance and impact over time. This can be interpreted as meaning all the attributes are required to create a more holistic outcome and without placing them into specific categories.

The research participants expected graduates to be knowledgeable and ethically sound professionals as well as having the ability to lead or contribute to the betterment of society in the widest sense of SD. In addition, they- included a specific attribute on enviornmental literacy while UNESCO's framework appears to rely upon this being covered by knowledge of the SDGs.

Conclusion

The framing of concepts and their understanding by others is predicated on the social, cultural, educational, and spiritual background of the authors. While scientific endeavour attempts to be objective and account for biases this is not as easily done for contested topics that are subject to much political debate. The UNESCO competencies for ESD are such an example, with more academic terminology and no explicit attempt to account for or reconcile the overlaps between the different competencies. Thus, the UNESCO competencies can be seen as an idealised set of competencies from which HEIs can adopt and adapt as they see fit. Nevertheless, this list can also be seen as a 'top down' list drawn from a literature biased towards the research emanating from so-called western or developed country traditions.

This paper has also briefly reported on a 'bottom up' list of graduate attributes for one country that were developed and defined by an in-depth participatory process involving one key group of stakeholders from that country, namely graduates and higher education students themselves (albeit that some participants graduated many years earlier). This list was not directly derived from the UNESCO list and the latter only indirectly informed the process through the mediation of the primary researcher, a doctoral student. As far as possible the list of attributes that emerged reflected the social, cultural, educational, and spiritual context of Myanmar. They therefore represent a primary guide to HEIs in Myanmar for when they can implement ESD in their curricula, leaving the UNESCO framework as a secondary influence. While the process used also provides a guide as to how other countries might develop their own primary set of graduate attributes for ESD.

References

Brundtland, G.H. et al. (1987) Our Common Future: Report of the World Commission on Environment and Development, United Nations General Assembly document A/42/427.

de Haan, G. (2010) 'The development of ESD-related competencies in supportive institutional frameworks', International Review of Education, 56(2), pp. 315–328

Lwin, B., Lane, A. and Slater, R. (2024) Contextualising the principles, policies and practices needed to implement education for sustainable development into HEIs in Myanmar, 4th Southeast Asian Conference on Education (SEACE2024), February 15–19, 2024, Chiang Mai, Thailand, available at https://papers.iafor.org/submission76409/

QAA and Advance HE (2021) Education for Sustainable Development Guidance. QAA and Advance HE, available at https://www.qaa.ac.uk/the-quality-code/education-for-sustainable-development#

Rieckmann, M. (2012) 'Future-oriented higher education: Which key competencies should be fostered through university teaching and learning?', Futures, 44(2), pp. 127–135

United Nations (1992) 'Agenda 21 - United Nations Conference on Environment and Development', Rio de Janerio, Brazil, 3 to 14 June 1992. Available at: http://www.un.org/esa/sustdev/agenda21.htm

United Nations (2015) 'Transforming our world: the 2030 Agenda for Sustainable Development', UN resolution. New York: United Nations. Available at https://wedocs.unep.org/20.500.11822/9814

UNESCO (2017) 'Education for Sustainable Development Goals: Learning Objectives'. Paris: UNESCO.

Wiek, A., Withycombe, L. and Redman, C.L. (2011) 'Key competencies in sustainability: A reference framework for academic program development', Sustainability Science, 6(2), pp. 203–218.

Contributing Institutions

EADTU | The Netherlands
FUNDECT/CNPq | Brazil
Hellenic Open University | Greece
The Open University | The United Kingdom
Universidade Aberta | Portugal
Universidad Nacional de Educación a Distancia (UNED) | Spain
Université du Québec à Montréal | Canada
Tampere University of Applied Sciences | Finland
TÉLUQ | Canada

Published by:
European Association of Distance Teaching Universities (EADTU)

DOI: 10.5281/zenodo.11653241