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Teamwork in higher education doesn't just happen: How an innovative online tool fosters students' collaboration and communication

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Abstract

In response to the growing importance of collaboration and communication skills in the digital era, this study investigates the efficacy of a novel digital toolbox designed to enhance teamwork among students. The toolbox, comprising self-study materials accessible via the institution's learning platform, was developed to improve team dynamics, communication and inclusion. A qualitative study involving 211 undergraduate students across 27 teams was conducted to assess the toolbox's impact on teamwork collaboration. Results indicate that teams utilising the toolbox experienced improved communication, conflict resolution and inclusion. However, inconsistent usage patterns revealed areas for improvement. The findings underscore the significance of thoughtful integration of digital tools in fostering effective and inclusive teamwork within higher education context. Furthermore, the study highlights the need for active support in developing these crucial skills, as they are not innate. This innovative learning approach offers benefits to students, faculty and institutions in addressing future skill requirements.

Keywords: *collaboration; communication; digital learning tool; teamwork; higher education.*

1. Introduction

Collaboration and communication skills have been identified as crucial "future skills" for higher education institutions (HEIs) (Ehlers, 2024). These competencies are essential not only for student success within academic settings but also for professional environments. In organisational contexts, creative innovation and productivity are dependent on effective teamwork; a subject that has been extensively researched (Tuckman, 1965) as well as described in management literature for decades (Katzenbach & Smith, 1993).

Despite the recognised importance of these skills, its implementation in both organisational and educational settings often fall short of its potential. Grote and Kozlowski (2023) posit that many organisational leaders mistakenly perceive effective cooperation as an innate phenomenon requiring no additional effort (Grote & Kozlowski, 2023). Similarly, based on their experience as HEI lecturers, the authors of this study argue that effective team collaboration among students requires active promotion and support rather than occurring spontaneously.

The context of this study is an HEI where student collaboration in the undergraduate programmes has been a cornerstone for many years. Despite the emphasis on collaborative work, there was a notable gap in providing adequate support for students to enhance their effectiveness in collaborative processes. To address this deficiency, the authors, applying a user-centric approach, developed an online repository of self-study materials. This online resource, named "Toolbox TeamCollaboration", is structured to align with the various stages of student teamwork. The materials have been made available on the university's learning management system, providing students with easy access to tools and strategies for improving their collaborative skills.

This conference paper presents the authors' approach and findings from designing and implementing this online tool to enhance student team effectiveness. The research aligns with the growing demand for innovative teaching practices in higher education, responding to policymakers' emphasis on digital teaching strategies to foster active learning among students (European Commission, 2014). The study addresses the following key areas:

1. The design and implementation of the online collaboration tool
2. Evaluation of the tool's effectiveness in promoting student teamwork
3. Implications for future skill development in higher education

By examining these aspects, this research contributes to the ongoing discourse on future skills in higher education and provides practical insights for educators seeking to enhance collaborative learning experiences.

2. Encouraging collaboration in student teams through digital tools

Student-centred learning and teaching (SCLT) practices enable students to participate in, influence and take responsibility for their learning pathways and environments. They therefore have the potential for a transformative learning experience and deeper learning outcomes. The approach also helps to create more inclusive and supportive learning and teaching environments. SCLT ecosystems provide not only learning support for students but also teaching support for lectures (European Commission, 2020). When creating an SCLT environment to support student teamwork, such as problem-based learning (Barrett, 2010) or other types of project work, it is rather obvious that among the many relevant skills (O'Neil et al., 2003), the core skills to focus

on are communication skills (Melguizo-Garín et al., 2022). Identified as one of the "future skills" relevant to HEIs, communication skills go beyond language skills, enabling students to engage in dialogue, discourse and strategic communication (Ehlers, 2024). Students need to communicate ideas clearly to others (Melguizo-Garín et al., 2022) and are expected to articulate their level of expertise on a given topic and the nature of their intended contribution to the project. They are also required to articulate their concerns about the approach or other components of the project if they are not satisfied with them (De Prada et al., 2022). Giving and receiving peer feedback becomes a critical success factor (Lerchenfeldt et al., 2023). Peer feedback and communication in general becomes particularly challenging in the face of a diverse student body. SCLT alone does not adequately ensure participation and the need for inclusivity remains (European Commission, 2020). Student projects are made up of individuals with different cultural backgrounds, personality traits, skills, values and experiences. For instance, the gender of both the speaker and the partner influences the expression of emotions and conversational style (Tenenbaum et al., 2011).

As Børte et al. observe, one of the prerequisites for students to more actively engage in their learning process is a supporting infrastructure for both, lecturers and students with the adequate use of technology (Børte et al., 2023). In their requirements analysis for a digital training toolbox, Francalanza et al. (2021) made a noteworthy observation: students do not inherently favour digital tools. Rather, the efficacy of an e-learning tool is contingent upon its design. Their findings suggest that content should be systematically organised, linked to real-world applications, incorporate visual elements and facilitate active participation. Thus, it is not the digital nature of the learning method per se that is paramount, but rather the thoughtful implementation of these design principles in educational technology (Francalanza et al., 2021).

In conclusion, while SCLT practices hold significant potential for enhancing student engagement and learning outcomes, their success is contingent upon the effective integration of communication skills and the provision of a supportive infrastructure. Additionally, the design and implementation of digital tools must be carefully considered to meet the diverse needs and preferences of students, ensuring inclusivity and active participation.

3. Methodology

The primary objective of this study was to investigate whether the implementation of this toolbox improves students' collaborative skills in project-based learning environments. The following research questions have thus been formulated:

1. How does the toolbox influence team communication?
2. How does the toolbox influence inclusion of team members?

In order to answer these questions, the study employed an action research strategy, utilising qualitative methods based on deductive reasoning. Aligned with critical realism, the investigation focused on mechanisms of social change within educational contexts (Bhaskar, 2008; Parker et al., 2024).

The toolbox was developed though a participatory process involving all relevant stakeholders, including lecturers, students, programme managers and the university's management board. This process entailed conducting interviews and workshops, facilitating group discussions and administering a questionnaire. The resulting toolbox adopts a user-centred approach, incorporating various resources such as documents, instructional videos, self-assessment tools and collaborative templates designed to support task-oriented teamwork. Following development, the toolbox was implemented over one semester during a collaborative student project. Thereby. the toolbox was made available to the students and faculty members, who were permitted to access the information and templates at their convenience.

3.1. Data collection

Student feedback is gaining prominence in the design of educational programmes, as it can inform structural adjustments to courses by highlighting areas requiring improvement. In a semi-structured questionnaire featuring open-ended responses, which facilitated in-depth analysis, students were invited to evaluate the toolbox's utility and the behaviour of all team members within the context of the project work. This qualitative feedback addressed specific elements of the toolbox and provided more detailed insights into its strengths and limitations (Parker et al., 2024).

3.2. Sampling

The study encompassed a cohort of undergraduate students enrolled in a specific Management module at the university. Participants were in their first semester of the programme and were required to collaborate on a project due for submission near the end of the semester.

The survey was conducted as an integral component of the project submission process, i involving 211 students working in 27 teams - each comprising seven to nine members - who were tasked with reflecting on their collaborative experiences. Upon conclusion of the semester, the findings were discussed with all students. Members from all teams, irrespective of their utilisation of the toolbox, contributed to the feedback. The survey achieved a complete response rate as it was linked to the module assessment. Throughout the research process, the investigators adhered to ethical data protection protocols.

3.3. Data analysis

The study employed relational content analysis to examine the data, focusing on specific concepts and relationships within the text. The researchers reviewed their findings and subsequently discussed the results with students at the conclusion of the first semester. This feedback process enhanced validation and legitimised the findings, aligning with organisational pedagogical research ethics (Göhlich et al., 2014). Enhanced reflection, supervision and collaborative interpretation helped mitigate challenges associated with researcher subjectivity. The statements were deemed credible, reliable and confirmable, with emphasis placed on identifying relevant features for future investigations (Bhaskar, 2008).

3.4. Results

Analysis of the survey feedback indicates that five teams did not consistently utilise the toolbox or incorporated its documents and information into their collaborative processes. However, those teams that did employ the toolbox throughout the project acknowledged its contribution to enhancing their operational efficiency.

> Team 23: "…particularly positive was the good time planning and the clear structure of the meetings using the templates in the toolbox…"

Certain statements indicate that some teams accessed the toolbox solely to present the 'team charta' – an initial requirement – to the lecturers during the introduction to the toolbox at the commencement of the project work. The primary findings demonstrate that utilisation of the toolbox enhanced students' collaboration skills during their teamwork.

Students effectively utilised the toolbox's resources to enhance interpersonal communication and mitigate potential conflicts. When interpersonal challenges emerged, they were successfully negotiated and resolved.

> Team 3: "…by working closely together, we also learnt how to resolve conflicts constructively and define measures together to better manage such situations in the future. At the same time, the toolbox taught us how to move and communicate effectively in a larger group…"

Teams developed proficiency in providing constructive and substantive feedback.

> Team 20: "…working with the toolbox made us realise how much mutual feedback and communication within the team help to improve collaboration…"

Furthermore, students expressed confidence in the toolbox's utility and indicated their intention to employ it in subsequent collaborative projects.

> Team 8: "…we found the information uploaded to the toolbox very helpful, so we were able to ensure a high quality of work. This can be used as a basis for future projects…"

Regarding inclusion, the research findings underscore the critical importance of integrating all team members into the project work. Students have demonstrated awareness of various ways to achieve this objective effectively.

> Team 1: "…all team members were equally involved in the tasks ... To strengthen cooperation, we organised team events such as a joint lunch..."

> Team 18: "…certain members were often absent, which made decision-making more difficult. Especially in a larger group like ours, it is important that all voices and ideas are taken into account..."

This study concludes that students who did not consistently utilise the toolbox encountered typical collaborative challenges and struggled to address them effectively. These difficulties encompassed inadequate planning, ambiguous role allocation and heightened potential for communication-related conflicts.

> Team 5: "...communication and writing was rather one-sided... In a next project we would pay attention to a more direct confrontation about the problems and consult the information in the toolbox at an early stage..."

> Team 11: "...a clear structure for communication and deadlines should be established right at the start of the work. Regular meetings and a detailed work plan that clearly defines tasks and responsibilities can help to avoid delays and misunderstandings from the outset..."

4. Discussion and conclusion

The students were incorporated into an innovative teaching and learning practice, in which they participated actively in the learning process. They were provided with a modern digital tool. Moreover, the toolbox has a well-organised design and provides problem-based and practice-oriented contexts (Børte et al., 2023; Francalanza et al., 2021; European Commission, 2020). This pedagogical approach facilitated the development and enhancement of students' team collaboration skills, thereby leading to more efficient team performance. Students who used the toolbox regularly were able to improve their teamwork significantly. They strengthened their collaboration, recognised the added value of the toolbox and quickly found solutions to challenges. Their communication and understanding of equal participation improved. The toolbox effectively promoted an understanding of diversity and inclusion. In contrast, teams that did not make regular use of the toolbox either failed to overcome the challenges or did so with considerable difficulty.

In relation to the utilisation and composition of the toolbox, the researchers sought authentic feedback, as they are committed to the continuous enhancement of the toolbox. It is

hypothesised that the absence of critical feedback may be attributed to the students' first semester in their programme and the novelty of the subject matter. Furthermore, the mandatory nature of survey participation as a component of the module assessment may have introduced social desirability bias into the responses. The toolbox has been integrated into the existing learning platform and adds strategic value to the university (Ehlers, 2024). It is part of a student-centred learning ecosystem, promoting teamwork and communication skills. Students are prepared for professional environments by developing crucial collaboration, communication and inclusion skills. Whilst the toolbox facilitates self-directed learning, first-year students still need lecturer support to cultivate their collaborative skills. Consequently, lecturers have to familiarise themselves with the toolbox to effectively guide students. Achieving this objective requires students and lecturers to engage in a collaborative process of reciprocal learning and support.

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