

Enabling digital transformation and sustainability via the use of Artificial Intelligence-powered learning tools and mobile assisted learning: Towards inclusive education in business and management schools

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Summary: (150 words)

Artificial Intelligence technology is poised to change Management Education dramatically increasing student efficiency and improving accessibility. The current study explored how Quizlet, a digital learning platform, can be used to help students (especially international) make sense of and memorise various terms and theories before a final exam using their mobile phones. The current study employed Classroom Action Research as its methodology and examined students' attitudes towards Quizlet using student focus group discussions and reflective reports. These were also triangulated with their lecturer's observations using thematic analysis. Findings indicated that Quizlet increased learners' engagement, and persistence in theory and concept learning as it used cutting-edge technology and fostered learner autonomy developing their metacognitive skills. Based on the outcomes of the current study, the researcher offers recommendations for the successful implementation of Quizlet in Business schools as it seems to transform students' learning experience fostering Social Justice, knowledge exchange, and sustainable learning.

Key words: Artificial intelligence, machine learning, digital transformation, sustainable learning, management education, well-being, innovation, inclusion, student learning attitudes, mobile assisted learning.

Word Count: 2770 words (excluding tables and references)

Introduction (530 words)

Artificial intelligence (AI) is a general-purpose technology that can perform several activities that were previously only performed by human beings. Some people reckon AI is a simulation of human mental functions carried out by machines. It is an area of research with many subfields. AI has recently had a fast and transformational impact on various industries i.e., healthcare, transportation, business, retail, construction, food industry, manufacturing, and education (Dwivedi et al., 2021). Due to the fast evolution of technology, the internet connection can now be accessed by learners from multiple devices, i.e., through their mobile devices, anytime and anywhere and allow them to access anything they wish. Students can easily download and use any learning application they want to enhance their academic performance. Although lecturers often complain because students can easily get addicted on their phones and use them constantly, lecturers may also use techniques and tools that students have easily access to through their mobile devices to enhance their learning by engaging students more easily and offering opportunities for personalised learning (Whalley et al., 2020).

This project used Quizlet as a revising tool to help students enhance their content learning in the domain of Leadership in Business Management (BM). Quizlet is a popular online learning tool which can be accessed through both computer and mobile device. It can be utilised to study any subject, but it can primarily support content learning and term retention, especially with low-proficiency, dyslexic, neurodiverse and international students (Waluyo and Bucol, 2021). In Quizlet, students can effectively concentrate on either self-study, pairwork, or group study to learn content, terms and develop their language mastery. In addition, lecturers can invite their students to create their own study sets, share them, and track their progress. Most importantly, it can be accessed freely by any student anywhere.

Vocabulary and acquisition of new terms are undoubtedly linked to the production and comprehension of language. Insufficient vocabulary and comprehension of new concepts may hinder students from understanding and producing speech and text. For example, Groot (2000) claims that vocabulary is closely connected with the development of reading, listening, speaking, and writing skills. Despite its primacy, many students lack the necessary vocabulary (i.e., terms specific to their discipline) for their academic studies (Barr, 2016), which can obstruct them from producing and comprehending a large coverage of speech or text. This is even more evident with international students who speak and write English as a second language (ESL) (Gass and Selinker, 2008). Many students show indifference to learning new terms as they consider it boring, extremely time-consuming, and ineffective. Therefore, terminology and new concepts needs to be learnt in an alternative way meeting students' specific needs.

An innovative way of learning new vocabulary, terms and definitions is by incorporating technology into the learning process, known as Computer Assisted Learning (CAL). It requires minimal guidance as students are already familiar with learning applications and using their mobile phones to download them and utilise them. Embedding CAL in content and vocabulary (term) learning is crucial since it offers learners metacognitive tasks allowing for making inferences through contexts using imagery and semantic techniques (Kose, Cimen, and Mede, 2016). Research indicates that the use of technology in learning is extremely beneficial as it engages learners promoting autonomy and enjoyment and developing students' digital literacy (Wieking, 2016).

The present study examined the perceived impact of the use of Quizlet as a revision tool that undergraduate students can utilize either alone or in pairs/groups to master content, terms, and definitions. In that way, students can also clarify different aspects of the theories while engaging in group work. Taking into consideration the need for developing BM students' content learning and preparing them effectively for exams in a relatively stress-free environment it is more important than ever to develop innovative ways to enhance students' content learning while involving them in highly attractive learning strategies which facilitate the revision and deep understanding of various leadership theories while engaging learners and helping them revise important, theories, terms, and scholars. Based on the findings of this study, recommendations will be provided as to how all relevant stakeholders in Management Education (ME) can promote the use of AI-powered strategies, such as the use of Quizlet combined with mobile-assisted learning, to support BM students effectively, further develop their digital skills and promote Social Justice for international students and students with special learning needs. This will hopefully allow HEI to improve student retention and progression rates.

Research Focus, Rationale and Questions and Methods (265 words)

To examine the perceived impact of Quizlet on 160 undergraduate HRM students (volunteers – randomly chosen), a mixed-method approach, classroom action research (Wallace, 2010) and a semi-experimental design were used. Qualitative data from student focus groups (twice during the semester) and students' final reports were analysed in QSR NVivo 9 by the researcher. Classroom action research was used in this study as it assists researchers to make decisions on what their future practice should be as it allows them to collect data from their everyday practice and analyze it (Wallace, 2010). During the 12 weeks of the academic term, students were asked to take part in two group tasks in weeks 5 and 11 in which they were asked to revise the theories, terms, and major theorists they learnt using Quizlet so that they could remember them for the final exam. The researcher also triangulated the data provided by the students with the lecturer's and her assistant's observations. This allowed a more in-depth exploration and qualitative triangulation (Flick, 2018) with the findings from students' feedback. The researcher analysed all data using thematic analysis (Nowell et al., 2017) to identify patterns in the data and use these themes to address the research questions.

The main aim of the current study was to answer the following research questions:

- What are undergraduate students' perceptions of Quizlet as a revision tool which enhances students' academic performance in the final exams promoting Sustainable Learning Development?
- What are undergraduate students' perceptions of Quizlet as a revision tool which improves students' attitudes, increases student autonomy and develops their meta-cognitive skills while fostering Social Justice?

Preliminary Analysis and Initial Results from First Phase (703 words)

The current study yielded rich preliminary data. The themes derived from the analysis of the qualitative data (focus group discussions and student final reports) revealed several benefits that students thought they gained when they used Quizlet.

Students' perceptions of Quizlet as a study tool which enhances students' academic performance in exams while promoting Sustainable Learning Development (SLD)

Students found the use of Quizlet very beneficial as it was extremely easy to use and allowed them to employ various tasks i.e., a mix of multiple-choice or multiple matching items, true/false exercises, flashcards and recall tasks. They thought that these had a positive impact on their academic achievement as they were able to recall the terms since they associated them with pleasurable activities they participated in with their friends (Dizon, 2016). They were also able to clarify points with their peers and lecturer as they were given plenty of time to interact and to reflect on their work so far.

Students also noted that Quizlet allowed them to use their mobile phones instead of their desktop computer and avoid boring and messy notebooks (Walters, 2012). That motivated them even more to devote considerable time after the implementation to revise the key terms and definitions related to their module. Students could even use them easily in their groups to form their study sets. This encouraged them to engage and devote more time and effort.

However, some students also revealed that they were challenged when they lost connection with the internet. Moreover, some students' mobile phones were rather small or old-fashioned and not that easy to use (Tran, 2016). They suggested that devices should have been provided by the university for some students as they needed support. Social Justice is still an issue in terms of using technology in the 21st century and both universities and our societies should provide equal access to all students to basic things i.e., free mobile devices and internet.

All in all, students were able to detect numerous advantages for Quizlet users but also offered suggestions to improve the overall implementation of Quizlet as a study tool in HE.

Students' perceptions of Quizlet as a study tool which improves student attitudes, increases student autonomy, and develops their meta-cognitive skills while fostering Social Justice

Students reported that they enjoyed working with Quizlet (Anjaniputra and Salsabila, 2018) as they could work in groups using words from their own language to ask for clarifications regarding the various theories. They were also able to develop their independence as learners and their meta-cognitive skills as they engaged in deep reflection in good company. This was also beneficial for their wellbeing in the post-Covid -19 era as they felt isolated and some of them faced mental health issues. Students were able to bond during this 3- hour long session and make decisions about their study load until the exam. They were tired of using notebooks and using their easily accessible mobile phones and games to enhance their learning was a relief for the students.

Nevertheless, some mature students expressed their concerns about being able to make use of this exciting app (Quizlet) efficiently as they were not very familiar with using apps on their

mobile phones (Dizon, 2016). They were a bit scared and disappointed at first, but they soon asked for help from their peers and were able to develop their digital skills and use Quizlet. In the end, they were grateful that they were able to develop their IT skills and proud they could use Quizlet as effectively as their younger peers.

To sum up, the findings from the current study indicated that students enjoyed their involvement in group work in which they used Quizlet to revise their work and make sense of terms and definitions. They created their own study sets and were able to share them with their peers. They found the whole experience enjoyable and valuable for their future academic and personal development. They were able to develop various professional skills and prepare themselves for the exams relying on themselves and their peers. They did encounter some problems, but they realized they had to develop valuable skills, i.e., IT skills and perseverance if they wanted to graduate and succeed in their future workplaces.

Theoretical Contribution of the Study (266 words)

Taking into consideration the findings of this study, one can also conclude that Quizlet fulfills most of the principles associated to the theory of Technology Acceptance Model (TAM) which was introduced by Davis (1989) and nowadays it is often used by researchers to foresee use and acceptance of information technology by its users (Surendran, 2012). In TAM, there are two factors that influence users to accept or reject any information technology; perceived usefulness and perceived ease of use (Davis, 1989). Davis believed that these two factors were important in determining one's acceptance or rejection toward any information technology. Perceived usefulness (PU) can be defined as user's individual perception toward the prospect that using particular information technology will improve the user's job or life performance (Davis and Venkatesh, 2000). Perceived Ease of Use (PEOU), on the other hand, is "the degree to which a person believes that using a particular system would be free of effort" (Davis, 1989, p. 214). In other words, the students in this study were willing to use Quizlet as they thought it would improve their performance and it was practical for them to use. This was also confirmed by other studies (Baptist, 2018; Christanti, 2018; Dizon, 2016). However, for the first time in the literature so far the current study revealed that Quizlet did not possess some principles i.e., the principle of 'Real world relevance' because sometimes the content of the sets were isolated words. Since vocabulary is one of the most important aspects of a language, it is of vital importance to involve more vocabulary practice in teaching-learning activities (Herrington et al., 2009).

Practical Importance and Implications

- **Implications for research (83 words)**

The current study used a relatively small sample which was not representative of BM students in the UK or even in London. More research is needed to explore the impact of Quizlet on students' academic and professional development especially in the post-Covid-19 era. The current study was conducted in the UK; thus, the results cannot be generalized across other countries. Moreover, a nation's culture and values shape diversity, thus cross-cultural and comparative studies can also be conducted by aspiring researchers in the field.

- **Implications for practice** (631 words)

Studies focusing on the use of Quizlet have so far been mainly exploratory. Its implementation into classroom practice was described by several researchers (Ismailova et al., 2017; Wolff, 2016). However, more papers are needed discussing Quizlet's effectiveness and its impact on student attitudes, metacognitive skills, and autonomy. The current project implemented Quizlet as a study tool in undergraduate education and revealed that learners were keen on using it, confirming previous research (Anjaniputra and Salsabila, 2018; Tran, 2018), especially when contrasted with analogue materials, such as notebooks, pen-and-paper flashcards, or traditional textbooks (Dizon and Tang, 2017; Kalecky, 2016). However, it remains contentious whether this positive attitude readily translates into more frequent vocabulary revision (Tran, 2018). The current study revealed several additional challenges that students face such as lack of suitable mobile devices on which to use Quizlet, reliable connection to the internet and IT skills.

In general, Quizlet is an easy-to-use vocabulary learning tool, accessed either on the web or via a mobile app. The seven self-study activities it has which comprise a mix of multiple-choice or multiple matching items, true/false exercises, flashcards, and recall tasks, which require typing the appropriate answer are examples of paired-associate vocabulary learning, which is considered valuable in acquiring meaning-form relationships (Elgort, 2011). Despite didactic reservations about such decontextualized lexical relationships, paired-associate vocabulary learning has proved to be an efficient measure to increase vocabulary size (Fitzpatrick et al., 2008). In this context, Fryer and Bovee (2016, 22) maintain "that [such] drill-and-practice e-learning can be instrumental, ensuring that all students acquire and operationalize foundational knowledge". Indeed, Quizlet's mix of seven different activities may prove to be a boon in this respect as previous research underlined that mixed-modality instruction and "a greater range of study options" may lead to better retention (Fryer et al., 2014, p. 32) as was also confirmed in the current study which highlights that students were excited by the variety of activities offered which were suitable for both group and individual work and developed their metacognitive skills gradually enabling them to develop their learning autonomy.

The students detected several benefits related to the use of Quizlet. The first benefit is that students consider Quizlet as a one-stop vocabulary learning application. Quizlet has various features and modes which really helped the students not only to learn the terms, but also to test themselves and practice their pronunciation (particularly useful for international ESL students). The Flashcard feature introduced them to the terms, and they could easily see the terms and the definitions just by tapping their screen. The Learn, Write, and Match features helped them deepen their understanding toward the terms and theories. Lastly, the Test feature helped them to find out how far they understood what they had learned. From these two cycles of Classroom Action Research, the researcher concluded that content learning via Quizlet was helpful for these undergraduate students. Moreover, the involvement of technology made the learning easier and more practical.

The current study highlighted some of the benefits and challenges of engaging learners in using Quizlet as a study tool in order to help them revise effectively for an exam. Overall, students felt Quizlet was motivating, lending for group collaboration, and created a strong gameful experience which allowed them to successfully revise for their exam taking into consideration all of the challenges different students faced in terms of the theories and the terms they had to

study. Quizlet was successfully used twice by all learners, irrespective of their background, and allowed them to find answers to questions they had and bond with their peers. This was an extremely positive experience as 95% of the students involved requested to use it again not only in terms of this module but in other modules and courses as well.

Discussion Point and Further Development (192 words)

AI is impacting education in various ways, and this is expected to continue. AI has produced educational tools which have attracted attention for their potential to improve education quality, enhance teaching and learning methods, and promote Social Justice and Sustainable Learning Development. In the coming decades, AI will transform education. Since students of today will work in an environment where AI is the reality, it is expedient that our academic institutions expose learners to AI technology. Definitely, more research is needed before we can reach safe conclusions about the impact of this AI-powered tool on students' academic achievement as well as the development of their learning autonomy and their meta-cognitive skills. However, we can claim that Quizlet is a promising learning strategy that can be initiated by educators in HE and further used by students who wish to prepare for exams, especially when they have to revise large amounts of theories and terms. Finally, we need to highlight the fact that Quizlet promotes Social Justice allowing students to work at their own pace and sustainable learning development as students can use it during and after their sessions to enhance their academic performance.

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