

EXPLORING THE USE OF A MOBILE APPLICATION DESIGNED FOR CAPSTONE PROJECTS FOR HONG KONG TERTIARY STUDENTS

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Abstract

The capstone project (CP) or its equivalent, as the most demanding assignment in undergraduate programmes, requires students to showcase the knowledge and skills they have developed during their studies. To produce a good quality CP, students need to attend to both the content and the presentation, the latter of which includes their ability to effectively and appropriately use the target language. This is challenging in the context of Hong Kong's tertiary education for two reasons. Almost all universities mandate that CPs be written completely in English, although English is not the mother tongue of most students. Further, there is a lack of curriculum space in the final year of the undergraduate program to offer targeted English language courses for helping students complete their CP. During the first months of the COVID19 pandemic, the situation was further exacerbated by the inability of students to meet their supervisors in person to discuss the writing and progress of their final-year project.

To address the CP language needs, a team of teachers and technical staff from five universities developed an in-house mobile app that offers discipline-specific support to final-year undergraduate students focusing on the English they needed to deliver their capstone project. The app offered three major functions: the learning tool, as the main function, provided discipline-specific English language learning tips; and two other functions provided opportunities for students to self-manage their project and communicate more efficiently with their supervisors. This article presents the findings from an exploratory case study using data collected from two groups of students, one group before the COVID pandemic and the other during COVID, and examines students' use of the app and their perceptions of it especially when the pandemic prevented face-to-face learning on campus.

Keywords: Mobile app, capstone, English, remote learning, higher education, COVID19.

1 INTRODUCTION

The capstone project (CP) is an important and challenging assessment vehicle for final-year undergraduate students. Typically, the CP allocates at least twice the number of credits that a regular course does and demands that students showcase the skills and knowledge they have acquired throughout their degree programme [1]. It is highly regarded by accreditation bodies and is used as an indication of student's graduating standard by industry while reflecting the rigor of an academic programme. It is valued by employers as it can reveal an applicant's creativity and innovation as well as their associated skills in research, communication, and digital literacy, which are increasingly necessary for success in any given career. A CP that includes professional literature and interventions helps students acquire evidence-based practice and prepares them for the competence they need to perform effectively in their career after graduation [2]. It has been found that a real-world CP develops students' critical thinking skills and broadens their team-building experience [3].

Undertaking a CP can be highly challenging for students. A CP consists of many stages [4], from finding and narrowing down to a suitable topic, to drafting the proposal, designing the project, and presenting the outcomes in writing and sometimes in a viva or a verbal presentation. A central competence for students at all stages of the CP is the ability to organize data and communicate their thoughts and findings effectively. These challenges are heightened for students who need to complete the project in a language other than their mother tongue, especially for those who are less than proficient in the target language. This is the case for many undergraduate students in Hong Kong, where almost all of the universities require a written and verbal presentation of the CP in English, which is a language that the majority of students mostly use only in the classroom. The CP is also likely to be the longest and most complex piece of writing students submit throughout the four years of their undergraduate studies, far longer than any report or essay they write in their other courses. The precise communicative demands required at each stage of the CP process can be daunting for senior-year students who experience a steep curve while learning to master both research and language skills in a compressed timeframe of 5 to 8 months in the final year of their studies.

The fact that there is usually no English language course in the final year further challenges students [5]. In view of this, a project team that consisted of English language teachers, CP supervisors and technical staff from five universities developed a mobile app to assist CP students, supported by a learning and teaching grant from the government's University Grants Committee. The project team determined that for the digital generation who are fixated on their smartphones, a mobile app would be the most effective way to reach out to students to provide real-time English language support that they would be able to draw on anytime and anywhere in their final year of study. The bite-size and micro-learning approach of mobile learning tends to be best aligned with the self-paced and independent work mode associated with CPs.

U-learning (ubiquitous learning) and m-learning (mobile learning) have been heralded as the modes of learning for digital natives. Studies report positive uptake of flexible, personalized and self-regulated learning by students [6], [7] and enhanced learner satisfaction and enrichment of existing learning and interaction activities [8]. In particular, "context-aware ubiquitous language learning (CAULL)" has been shown to be effective for both high and low achievers and can enhance learners' self-efficacy [9]. Research has further indicated that adjusting app content to suit students' needs [10] [11], and providing timely feedback via instant messaging can contribute to positive learning outcomes and facilitate mobile learning communities [12]. As for language learning, apps that are specifically designed for the learning of English help students with vocabulary retention [13], participation and interactivity [14], and increased level of confidence [15]. Collaboration in task-based m-learning promotes social constructivism, aids foreign language acquisition in situated contexts, and promotes both learning and affective gains [16]. These benefits continue even in remote learning situations in which students make use of mobile apps to increase their exposure to the target language and add enjoyment and variety to their learning [17]. This has been especially important during the worldwide COVID pandemic, which has forced students around the world into a distance-learning mode.

The five-university project team followed the principles discussed in the literature and designed an app with the primary aim of enhancing students' English communicative competence needed to complete their CP. The app offered support via English learning materials that were discipline-focused, rather than the typical generic academic English support, which, for the CP is generally considered inadequate [18]. In this way, after logging onto the app, engineering students of one university saw engineering-related CP structure, writing samples, and the proper referencing format; likewise, business students were shown materials related to the business discipline and their CP requirements. The learning modules covered the different stages of a CP from the proposal to the various sections/chapters of a CP, including the abstract, introduction, literature review, methodology, findings, discussions, conclusion, and references.

At the initial stage of app development, the project team surveyed students and supervisors, and realised that besides language-learning support, users would want the app to contain functions that could help students manage their CP processes and facilitate student-supervisor communication. In light of this understanding, a scheduler was added to the app to allow the university, the supervisor and the student to insert to-do lists and deadlines. A text-chat function had also been gradually developed over previous years, at first enabling chat between only one student and one supervisor; then it was expanded for chat between multiple students and supervisors. This article describes two pilot studies of the app by two groups of students in the lead university on the project team: the first group before COVID when students experienced a normal academic year on campus and the second during COVID when students adopted remote learning.

2 METHODOLOGY

The present study involved 12 final-year engineering and business students from The Hong Kong Polytechnic University (PolyU), the lead institution in the 5-university project. These students were required to complete a CP in the final year of their undergraduate programme. The CP has three major writing assignments that students need to submit throughout that year, namely, a proposal, an interim report and a final report. Final-year students were recruited through supervisors and departmental emails calling for student volunteers. Students were given a consent form and a briefing on the objectives of the study.

The data reported in this paper were collected via semi-structured interviews. This method was chosen because this type of interview has a clear agenda, and is flexible enough to provide space for interviewees to express themselves with minimum control [19] and allows the interviewer to collect new data and explore other topics of interest with the interviewees [20]. In our interviews, guiding questions

were formulated and targeted the user experience and feedback on the app functions and features. Students were asked questions covering the three main features of the app, namely the learning modules, the chat function, and the to-do list. They were also prompted for any suggestions they might have for app improvement. The main interview questions were supplemented with items regarding their capstone project experience, such as areas of concern, challenges and difficulties when writing and presenting their CP, and their relationship with their supervisors.

Among the twelve students, six wrote their CP in the academic year 2018-19 before COVID19 when they undertook their studies in a normal learning mode. For this group, called Group 1, interviews were conducted face-to-face. The second group of students took their courses remotely during campus lockdown due to COVID19. Some students in this group were interviewed in semester 2 of the 2019-20 academic year and some in semester 1 of the 2020-21 academic year. Due to the coronavirus, interviews for students in Group 2 were conducted online via Zoom. Student participation was voluntary. Interviews for both groups were conducted in English and averaged under 45 minutes. The interviews were recorded and transcribed.

3 RESULTS

3.1 Student interviews

Interview responses revealed the user experience and app usage of the two groups of students. The first section briefly describes how students felt about their use of the app, while the next two sections report how students engaged with the app's functions and how they could be improved. The last section provides additional insights on the impact of remote learning on the CP learning process. The major findings are summarised below; commonalities and differences between the two groups are highlighted.

3.1.1 Ease of use

Most of the respondents were satisfied with the app's ease of use. Students reported that they "put time on their phones" and have their phones on them "all the time". They saw the mobile app as a suitable channel for bite-size learning because checking the app only took a few minutes of their time and gave them what they needed in the shortest time possible. They could scan through the app and its materials and choose what they needed. One business student said it was "easier to look at the app than use Blackboard", the university's LMS, while an engineering student commented that the app was "quite useful because you just need to check it on your mobile phone and see some materials that relate to your projects. [And] you can get it more quickly rather than you surfing the Internet because they have different formats". These findings are consistent with previous studies that highlight users as digital natives who learn in "short bursts" [21] and view mobile phones as ideal platforms for "individualized formal and informal learning" [22].

3.1.2 Use of learning materials

Among the functions in the app, students in both groups often used the learning materials, which were a key feature of the app. They rated the app as either useful or very useful when writing their reports for several reasons. First, the app supplements other inputs about CP writing. The interviewees had all attended a CP seminar organised by their departments, whether it was a one-off class or a semester-long, but they felt that they had been overrun with information that focused on general guidelines and technicalities, such as explaining the project assessment, strategies to prevent plagiarism, and how to submit their CP through Turnitin. However, as one student remarked, such information is generic, and departments do "not provide enough material". In the students' view, our app complemented seminars and information from their departments by providing them with "lots of examples and a different structure" on how to write a CP report.

Second, the learning materials provided enough guidance to lead students in the right direction. Interviewees noted that they had some vague ideas on what they would want to do for their CP but had a difficult time putting their thoughts in writing, especially at the start of the process. The engineering students in both groups found the CP a daunting task. They were aware that the CP requires writing that demonstrates not only their technical knowledge but also the ability to present their work coherently and clearly. One business student in Group 2 was especially thankful for the app and pointed out that "unlike many other writing guidelines, it is concise and organized in bullet points so that students can learn the necessary knowledge in short time".

Another positive remark from several students was that the app enhanced their English language learning. Previous studies have shown that non-native English speakers face difficulties in writing academic papers [23] [24]. In a similar vein, some respondents mentioned that their English was "not good" and saw this as a concern when writing their reports. One engineering student claimed that he often used simple sentence structures but realised that such simplicity did not meet the expectations of a CP which he believed should be written more academically. One business student also discussed the difficulties had in understanding the jargon and technical terms in journal articles, and the need to spend a lot of time reading these papers. Others who were more confident in their English ability stated that although the app contained some of the language points that they had previously learned, they still felt that reading the grammar tips on the app served as a useful reminder for them when they actually had to start writing their CP.

Overall, the feedback on the learning function of the app was generally positive. Students found the learning materials helpful, but they also saw room for improvement in the materials. Both groups of students asked for more samples of previous students' CPs and more diverse topics in the examples because not all of them worked on the same area of study even though they were from the same department or programme. They claimed that having more samples would give them ideas on how they could organize and structure their own writing. Group 1 students requested additional modules, such as ones on oral presentations, which they found challenging because they did not know what data and how much of it they should present in the limited time, nor did they know how to answer challenging questions during the Q&A session. After receiving this feedback, an oral presentation module was added for the 2019-20 academic year, and the Group 2 students stated that the oral presentation module helped them prepare better for their presentations and demonstrations. One business student in this group said that he liked the instructions on how to cite PowerPoint-slide sources and applied the new-found knowledge in practice by verbally referring to sources at an oral presentation, which was something he "didn't know very clearly before".

3.1.3 Feedback on the supplementary management and communication tools

The management and communication tools were secondary features of the app, and for these aspects we found slightly differing views between the groups. For Group 1, the chat function was not functioning properly and students encountered technical difficulties. Originally, the app was developed as a one-to-one chat between supervisors and students only because the project team had assumed that students were working individually on their CP. However, through our interviews with Group 1 business students, we learned that some departments told students to work on the CP in groups. This feedback triggered us to expand the features of the chat to allow multiple 'chatters' that not only encouraged more students to use the app but also increased student motivation to use the app. In sum, Group 1 students were generally favorable towards the chat function and believed that it was a potential tool for collaboration and interaction.

The second group that did their CP during COVID were able to use the chat function. Group 2 engineering students worked individually on their CP and occasionally used the single-chat function to exchange messages with their supervisors. When they had a problem or a question, they found the chat function useful for sending short text messages to their supervisors and later would switch to email when it was necessary to share some documents or other materials. One engineering student still preferred email partly because he found typing emails easier. The limitations of the chat function also made it challenging for him to write a long message to elaborate his point or explain his issues, particularly when he got "stuck".

Since the business students in Group 2 were in the relatively early stages of their CP, they used the chat function much less than their engineering counterparts. They felt that at this early stage, communication via email was more appropriate and formal. They associated chat messaging with a more casual channel for short, quick, and informal text-conversations, and they did not yet feel comfortable enough with their new supervisors to send this kind of text. Two students did try exchanging messages with their supervisor through the app; however, no reply was received. As for the group chat, only one student tried it with his group mates, while the other two were unable to use the group chat because they had no one to exchange messages with. They mentioned that when they wanted to have intra-group communication, not everyone in their group immediately thought of the app and its chat function. Instead, they thought of other existing instant messaging applications, e.g., WhatsApp, that they already had the habit of using.

Group 1 students viewed the to-do function on the app as a reminder tool. It was used to check and review deadlines, and in a few cases, students interactively created personal to-do items and marked

completed tasks by clicking on the check button. As one business student remarked, “this app can keep remind me and my teammates to finish the work before deadline”. Group 2 students liked the design of the to-do function with its quick view of the scheduler, which helped them “visualise the coming deadlines”. Although students saw the to-do feature as helpful, many in Group 2 were used to managing their deadlines with their own schedule planners or their phone’s calendar. One flaw that an engineering student found with the to-do list was that the department and the supervisor had not revised the dates on the scheduler to reflect the changes caused by the pandemic. He remarked, “I rather do the schedule myself”.

In general, students were glad to see the to-do feature on the app, which helped them with managing the CP process; however, some wanted improvements and additional functions in the to-do list to enhance their user experience. For example, Group 1 students wanted to be notified of deadlines so that they would not miss any. Since receiving this feedback from Group 1, the project team improved the function, and Group 2 students were able to receive notifications of deadlines, which they welcomed. Another comment from both groups of students was that the to-do function could be made more interactive by allowing it to be synced to either their main calendars, or in the case of the business students, be shared with group mates within the app. As the business students claimed, a shared calendar that can be viewed by everyone in the same CP group would make it “easier to arrange things” and would be “more helpful”. At the time of writing, the technical staff on the project team are looking into the possibility of adding this calendar-sharing function.

3.1.4 Remote learning amidst the pandemic

COVID has upended learning in Hong Kong institutions. Interview responses revealed that the students used various methods to cope with remote learning. Some found online learning boring, while others chose to skip the live classes and watch the recordings at their own pace because class attendance in some of their courses was not mandatory. Students also noted the challenges of shifting to online assessment, looking for available resources to do their assignments and projects, as well as dealing with unstable internet connections and other disruptions. All Group 2 students missed the socializing aspect of learning where they could interact with teachers and classmates face-to-face. Even though some online classes were engaging and interactive, students still lamented the lack of social interaction, which demotivated them from studying. For example, one business student claimed it was sometimes hard for her to be self-motivated to learn and get things done at home.

Two major concerns shared by Group 2 students were related to communication and conducting research related to their CPs. communication, students had to adjust the way they contact their supervisors and connect with their group mates. Their university switched to remote learning in the middle of the first semester of the 2019-20 academic year due to protests in Hong Kong, and this continued to the next semester when the city was hit by the pandemic. This impacted how students interacted with their supervisors. For example, the engineering students previously had a monthly meeting with their supervisor on campus in the first semester; however, the face-to-face meetings switched to email communication in the second semester. There was the option to do video chat, but that option was new to students, who preferred to “use email to chat with him”.

The business students had a slightly different problem because they worked in groups, so they had to find ways to have meetings with their group mates and their supervisors. Due to the pandemic, groups working on their CP had to work remotely. In some instances, international students who had returned to their home countries were obliged to do group work remotely. In the case of one of our respondents, two of his group mates were stranded in Mainland China. They could not meet face-to-face to work on their CP together and ended up with less time to discuss the work they would normally do individually or together. A business student remarked that it was more difficult to “motivate online” his group mates who were in Mainland China about doing their part than if they had worked together face-to-face. Another challenge that students raised was Mainland China’s internet connectivity, delays and speed. Added to these problems is the fact that several social media websites and applications, such as those by Google, are not available in mainland China. At first, the project team thought that students could access our app via the university’s VPN, but students told us that even when they could download the app, they could not log on. This severely impacted the group’s use of the app’s chat function and they had to resort to other communication channels that could function well in China.

Our student interviewees also grappled with how to conduct their projects. For one, the campus lockdown affected how students could access language and learning resources related to their CP. In a normal semester, students can visit the self-access centre and avail themselves of the different types of support on academic English writing and speaking, e.g., they can make an appointment with a teacher

for writing or speaking consultations if they need assistance. However, the pandemic made that impossible. Difficulties with accessing laboratories and equipment also affected how students could carry out their CP. Engineering students who often had to use the equipment housed in the laboratories on campus had to modify their methods and instruments to accommodate working remotely. As one student commented, “previously, I expect to use some of the equipment on campus; however, you know that the campus closed quite a long time. I have to modify my own equipment and use the other equipment which is not that appropriate. The performance is not that good. And I can only do it in my home”. Business students may not need laboratories the way engineering students do, but some had to do field research which required visiting sites, building a rapport with company staff, accessing company data, and conducting interviews or surveys. Since these students were still early in their CP process, they recognized that they would have to factor in the pandemic when they finalized their proposals and began collecting data. One business student claimed that for groups with students in mainland China, this meant those group mates would have difficulty accessing certain resources i.e., Google products, and they might need to re-allocate the work among themselves to accommodate these unexpected difficulties, including logging on to our app.

4 CONCLUSIONS

The findings suggest that the project team has taken a step forward in developing a mobile app to support final year students’ CP needs. The app’s “one-stop” shop design that incorporated language learning, CP management, and student-supervisor text-chat communication was welcomed by students. The bite-size learning format of a mobile app was found to be appropriate, making it fairly easy and convenient for students to work in “short bursts” on CP-related matters.

The findings also indicate that the project team’s efforts in improving the app after receiving feedback from Group 1 students were useful. Improvements to the various features of the app, such as adding in more learning materials and modules, and expanding from individual-chat to group-chat functions, were welcomed by Group 2 students.

Interviews with Group 2 students reveal that the mobile app does play a role in remote learning at times of uncertainty, such as the crisis brought by the pandemic. Student feedback reflect their appreciation of the app as an additional channel for learning and for communication. The project team is thankful to the students for pointing out the problems with access from mainland China, which is an important aspect that the technical team is trying hard to address; and for informing us of a certain level of reluctance from both students and supervisors to use the chat feature since they are already in the habit of using other apps for this function, such as WhatsApp. Those who used the chat on the app enjoyed the convenience of accessing the app as a one-stop-shop for CP-related matters.

The coronavirus has taken higher institutions around the world by surprise and ad-hoc measures had to be put in place in 2020. However, with the huge number of infections and the uncertainty of a vaccine, remote learning may be here to stay for at least a while. The findings reported in this paper trigger us to rethink how learning can be facilitated in a non-ad-hoc manner in the new normal of learning and teaching, where pedagogy, technology and innovations converge.

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