THE CHINESE UNIVERSITY OF HONG KONG

Courseware Development Grant (2019-22)

Scheme 2 – Pedagogy research

Final Report

Please return by email to CUHK cdgs@cuhk.edu.hk

PART I: Summary of Project

1. **Title:** Integrating Instant Messaging (IM) to Enhance Online Teaching and Learning During Covid-19 Pandemic

2. **Principal Supervisor(s) and Co-supervisor(s) and the respective Unit(s).**

Name	Post	Unit/ Department	No. of funded TDLEG (of any funding scheme including the CDG for micro-modules) serving as a **Principal Supervisor**				No. of funded TDLEG (of any funding scheme including the CDG for micro-modules) serving as a **Co-Supervisor**			
			12-15 Trien-nium	15-16 roll-over year	16–19 Trien-nium	19–22 Trien-nium	12-15 Trien-nium	15-16 roll-over year	16–19 Trien-nium	19–22 Trien-nium
			(Please **specify the number** in the relevant boxes)							
Principal Supervisors										
LI, Kwan Hung Leo	Lecturer	CRS				1				

3. **Project Duration: from April 30, 2021 to April 30, 2022**

4. **Project objectives:**

This project aims to develop a pedagogy guidebook to enhance course teaching and learning by using instant messaging (IM) in e-learning and m-learning environment. The plan is to implement IM usage in a UG faculty-package course consisting of a large class of major and non-major students in an e-learning environment and explore its effect. However, due to limited technical knowledge of the student helper and research assistance, the guidebook's detail is confined to qualitative descriptions and not in a format that can be further developed into an auto chatbot as planned initially. Also, during the implementation of IM usage in the UG course teaching, this PI realized it is difficult to control the process and outcome of the project. It is because this PI is not the course teacher (and the issue is further complicated as the selected UG course is co-teach by two teachers), plus the first term of the academic year switched back to face-to-face mode.

Therefore, we downgraded the monitoring activities intensity and added a part to the project to compare the results with IM usage in different teaching scenarios.

5. Activities, processes and outcomes:

Mobile-learning (m-learning) research has already been performed on the use of instant messaging (IM) to facilitate higher education (Nicholson, 2002; Kadirire, 2007; Hou and Wu, 2011; Lauricella and Kay, 2013; So, 2016; Bere and Deng, 2018). Simon So has researched the use of mobile instant messaging to support teaching and learning in a group of undergraduate students and published a paper titled "Mobile instant messaging support for teaching and learning in higher education" in 2016. Students who had smartphones with WhatsApp were assigned to experimental and control groups. The experimental group was supported with bite-sized multimedia material and teacher-student interaction outside school hours, while only academic communication was maintained in the control group. The result shows that the experimental group's performance is better than the control group's. Australian researchers also revealed that instant messaging in the eLearning environment is more effective than face-to-face teaching and learning (Bere and Deng, 2018). These studies are inspiring, especially when online teaching is necessary and teacher-student interaction is complicated when the Covid-19 pandemic is still a threat.

Nevertheless, So's study's use of WhatsApp as an IM platform could limit the study's results. Features of WhatsApp are limited compared to Telegram (TG). TG can use Bot to manage the group, conduct a poll, and use pinning and tagging functions to search the group's content quickly. File capacity that can be transmitted within the TG group (1.5GB!) exceeds that of WhatsApp; thus, even an hour of video content can be exchanged. Not to mention TG is cloud-based, and its privacy setting is more acceptable for the student. This project investigates the possibility of enhancing e-learning and m-learning in humanity studies at CUHK by integrating TG.

The micro-module developed in this project is a part of micro-learning by teaching and delivering content to students via an instant messaging (IM) platform to support blended learning and facilitate teacher-student discussion in a hybrid learning environment. This development aims to enhance teaching and learning, which can be continued and extended beyond the (online) classroom and scheduled class time by mobile technology. A mobile device app, TG, has been used in this project as the IM platform. The usage of IM was monitored during the period when IM was used in course teaching. A survey was used at the end of the term to evaluate the effectiveness of teaching and learning. In addition, all the IM posts have been categorized and analyzed further so that researcher can produce a guidebook for other teachers' course teaching.

This project consists of two phases. In the first phase, a student helper was hired to transcribe and categorize/thematize the content of the posts/conversations in the TG course group that I taught during the academic year 2020-2012. The courses being taught are 1. THEO3217/5301 Biblical Hebrew I and THEO3218/5302 Biblical Hebrew II, a series of double-coding courses (i.e., undergraduate and postgraduate students share class activities) on learning an ancient language to

facilitate the reading and interpretation of the Hebrew Bible; 2. THEO5919(RELS5219) Hebrew Bible in Contexts and THEO1211/5311 Introduction to Hebrew Bible, as both are courses to introduce the content and interpretation of the Hebrew Bible, but one with the emphasis on ancient and modern contexts for the postgraduate student (THEO5919) and the other on the canonical process and the meaning of religion tradition transmission for mixed undergraduate and postgraduate students (THEO1211/5311).

IM posts from different postgraduate courses were categorized, and principles of using IM in course teaching and learning were deduced. Finally, the insights on using IM in course teaching were implemented in the first term of the academic year 2021-2022. CURE1110, taught by Dr. Wai Yin CHOW in the CRS Department, was the course for this implementation. CURE1110 is a course with around 60-65 students each year. This course is designed to facilitate students to understand contemporary religious issues and themes. Particular emphasis will be placed on the changes in traditional religious beliefs and practices in the context of modern society and culture. The PI helped the course teacher implement IM in this course with the help of a research assistant (RA), and the RA monitored students' usage. At the end of the course, a quantitative survey was deployed to gather further information on the student's evaluation of IM's use during course teaching. Ultimately, all the usage of IM in different course scenarios was evaluated.

During the process, there is a change in the course teaching by integrating the use of IM and LMS (learning management system). Since the course teacher insisted the primary way of delivering course material must be the University endorsed LMS (i.e., the Blackboard) for fairness, we realized it is better to integrate the use of IM and LMS by uploading selected posts in the IM to the LMS. The result makes the IM posts easier to search, and the course teacher can keep track of what has been discussed and interested in the students during the course.

We distributed an online end-term survey entitled "Integrating Instant Messaging (IM) to Enhance Online Teaching and Learning." We received 41 responses from 5 courses: The Hebrew Bible in Context (THEO5919-RELS5219), Introduction to Hebrew Bible (THEO1211-5311), Religion and Contemporary Life (CURE1110), Biblical Hebrew I (THEO3217-5301), and Senior Seminar (GECC4130). This end-term survey shows that 90% of students using IM during course teaching agree that IM can enhance their learning, and 80% find it more satisfied in course learning than those without IM.

Most of the students agree:
"This group can remind me of the course's schedule." (87.9%)
"Through this group, I can get the course material more convenient, and access them anytime anywhere." (85.4%)
"This group can enhance my learning." (90.3%)
"With the use of TG, I am more satisfied with the course (compared with other courses without using IM)." (80.5%)
"Using IM in learning is efficient: it helps me use my free time." (73.1%)

Most of the students disagree:

"Using IM in learning is distracting: I will be distracted from real learning." (68.2%)
"I am distracted from real learning. Using IM in learning is annoying: it invaded my private life." (68.2%)

The student expects the IM group to send course materials, which is the essential function. Besides, they think "ask questions (learning)" and "Interact with other students" are also crucial to using IM.

6. Deliverables: (please provide details under this section and the relevant summary statistics in the tables in Part IV)

The project result will be applied to the revision of the guidebook and delivered to the faculty workshop. In addition, the project enables us to identify good practices for using IM in course teaching and understand the constraints of implementing it in different course scenarios.

The guidebook facilitates teachers to implement and yield beneficial results in using IM in course teaching. After a brief introduction on why using IM in the course teaching, this guideline will proceed in four parts: The first part is implementation, which includes procedures for the teacher on how to initiate the class to use and setting up the IM Apps (here: Telegram TG) before the course started. The second part will be the guidelines on how to execute the usage of TG. It helps the teacher what to notice in a conversation to enhance students' learning outcomes. The micro-module developed in the project can facilitate content delivery to students. However, when and how to deliver the content matter via an IM platform to support blended learning and teacher-student interactions in an e-learning environment. For example, it will advise that content should be cut into bite-size and suggest methods for doing it. The fourth and final part of the guidelines will be a consolidation session. It elaborates possible issues the teacher will encounter, like dealing with the digital divide and conducting an efficacy survey to check how well students benefit from the educational technology. Other features that can be used in the IM platform include saving content in the cloud server, polling, tagging, emoji, or integrating with LMS, which will be discussed. By addressing the research question of this project, i.e., what and how the teacher's response in IM help facilitate and enhance student learning, this guidebook will suggest ways to achieve the goal of this project (see reflection).

People spend more time on their mobile devices than ever before. Mobile learning accompanies e-learning and certainly is a trend for life-long learning. The strategic theme of CUHK for education is "nurturing lifelong learners as global leaders." This project extends teaching and learning beyond the classroom by mobile technology and help students be better learner using their mobile devices. As a result, students can learn and understand better on the go.

7. Key Performance Indicators and Evaluation:

We distributed an online survey entitled “Integrating Instant Messaging (IM) to Enhance Online Teaching and Learning.” We received 41 responses from 5 courses: The Hebrew Bible in Context (THEO5919-RELS5219), Introduction to Hebrew Bible (THEO1211-5311), Religion and Contemporary Life (CURE1110), Biblical Hebrew I (THEO3217-5301), and Senior Seminar (GECC4130). Finally, we evaluate the use of IM in course teaching against some of the key performance indicators for our project:

IM as a convenient tool for learning?

Students appreciate TG’s group because it is convenient to use, as they express in their comments about TG: “convenient to discuss,” “more convenient,” “very convenient,” and “easy to access.” Although WhatsApp is the most popular instant messaging app, students also use TG in their life. Also, the survey shows that using TG is not a problem for students, as there is no statistical significate association found between whether one uses TG in their daily life or not. On the other hand, 73.1% of our interviewees agree that “Using IM in learning is efficient: it helps me use my free time.” Over half of the interviewees (65.9%) read the message when they are free. 29.3% of interviewees read the message right after the notification. It shows that IM can quickly deliver messages to students and is a convenient communication tool. For example, 87.9% agree that “This group can remind me of the course’s schedule,” and 85.4% of students agree, “Through this group, I can get the course material more convenient, and access them anytime anywhere.” Therefore, it is more suitable to distribute administrative messages by using TG. Another example also shows, through analysis of students’ interaction in TG’s group, that students tend to be more active if it is closer to the assignment’s deadline.

There are some limitations to using TG. As students’ responses: “Flood of greetings (sometimes) cover important information,” “Hard to sort the materials,” and “difficult to chase the message as there is no star function of IG.” One student suggests that “The TG group may function well for communication only: give urgent notices, change schedules, etc. It should be supplementary and not the main tools of learning.” Therefore, although it is convenient to use, some limitations must be considered.

Regarding this, the integration of IM with Blackboard/LMS during the project proved effective. It can facilitate students and instructors to retrieve and search the material that has been posted in the TG.

Using IM to facilitate students’ discussion?

From the survey and our observation, students appreciate TG as it can serve as a discussion tool. However, they are not those who are active in TG’s discussion. Many express that they appreciate TG for its discussion function:

- It’s fantastic to ask questions

- Convenient easy to find the materials, speedy response, encourages discussion
- One message to all; efficient. Build up the team quickly on an everyday basis.
- Thanks for the group; it helps sometimes
- Timely reply, easy access even though we have different living rhythms
- Very effective did discussion

Students are eager to discuss/raise questions in the TG group when: (1)there is something they want to ask (65.8%); (2)TG is convenient for them as it can use anytime and anywhere (60.5%); (3)If they think the topic is interesting, they will have more motivation to contribute in the discussion. Meanwhile, if they have nothing to ask, they will not join the discussion (46.9%). From our survey and analysis, some students regard TG as another more convenient platform to get the course's information (40.6%).

On the other hand, almost half and half students were willing to discuss/raise questions in TG's group. It is interesting that although they quickly read the message and they think "ask questions (learning)" and "Interact with other students" are critical of using IM, most of them do not feel eager to respond. This problem is observed in the TG group. Even if the TG group has some fascinating discussions, not everyone is keen to participate. Although students appreciate the forum on the TG group and express that they would be willing to raise questions, it may not be easy to arouse a discussion among them, which has been the case during face-to-face lessons. It seems that our students are more passive than active.

On the other hand, a few students will occasionally dominate the group conversation. However, the survey has some limitations because of the different course requirements. For example, since seminar students need more discussion, they agree that TG's group is comfortable for them to communicate with, and they are more willing to discuss/raise questions in the group. Furthermore, if the group is mainly from the same program/major, students get along better in the group.

Due to the time limit, we cannot explore how students respond differently in TG groups and face-to-face lessons. However, we cannot assume that students are not learning when they are not responding in the group. The survey shows students' habit of reading messages is responsive. Students expect the TG group need to send course materials, which is the essential function. Also, they receive and read the message whether they will reply or not. Thus, if the message is simple and short, students can learn from IM more easily. As 90.3% of students state that "This group can enhance my learning," and 80.5% agree, "with the use of TG, I am more satisfied with the course (compare with other courses without using IM)."

<u>Teacher's interaction is important</u>

Many students appreciate the teacher's response in TG's group:

- The teacher responds to the different topics with details
- Leo responded really fast to all our questions and shared a lot of relevant information

- The teacher is very welcoming in answering students' questions
- Teacher's response
- the lecturer is very responsive
- Leo sir has quick responses to students' questions and comments.
- Very appreciated lecturer could reply to our questions / sharing together with the relevant journals or books so we can get the answers in more in-depth
- Compared to different courses, the more interaction the teacher encourages, the more responses the students give. "However, it may burden teachers on extra workload." As one student said.

The project shows the incentive in implementing mobile learning is vital to the success of using IM in course teaching. The student will be more engaged in course learning if the teacher is responsive, eager to share, and available beyond the class setting.

Some limitations and disadvantages of using IM.

One of the significant disadvantages of using IM is that it may be distracting. Some students express that it is "Annoying" and "Information can be too overwhelming at times." Although some students see the same point, the percentage is not high. Only 31.8% of students think that TG distracts their real learning and is annoying as it invades their private life. Therefore, we suggest that the amount of information and how to distribute it need to be organized and designed not to affect students' learning.

Is IM suitable for full/Part-time students to use?

According to our survey, part-time students are more satisfied with TG and less distracted from real learning with IM. It is understandable as part-time students have a high incentive to learn. However, full-time undergraduate students are more willing to raise questions. That could be because they allocate more time to their studies.

8. Reflection

At first, we planned to use pre-course and post-course quizzes as the key performance indicators and help monitor the overall performance of a randomly pre-selected group of students. However, the course teacher considers such measures may cause some non-major students to complain about the class's fairness. As a result, we recruit students to participate in the research on a voluntary and anonymous basis which is hard for the investigators to track the student's overall performance. We are now more focused on a term-end survey and invite project volunteers to have interviews to evaluate the effect of using IM on students' learning in a qualitative and self-reflective manner. The course teacher also insists the primary way of delivering course material must be the University endorsed LMS (i.e., the Blackboard) for fairness. It eventually affects the design of using the IM in the course teaching. We suspected this would reduce the student's incentive using the new

pedagogy and influence the key performance indicator.

Our initial planning was to implement IM in an e-learning environment. Yet, the University decided to have all classes in the face-to-face mode, which affected the progress of our project. As a result, the demand for using IM as a communication and teaching tool is lowered. The course instructors' mentality jumps back to relying on classroom teaching rather than experimenting with new mobile-learning pedagogical methods. We reflect that using IM to enhance learning depends on how much the instructors adopt a mobile-learning mentality, i.e., how well the instructors feel comfortable extending their teaching beyond the classroom walls.

From the analysis of the TG posts, we observe that students' discussion was most active was the period when the first few weeks when the course had just started and the last few weeks when assignments were going to submit. TG is a great tool to remind the student and communicate the teacher's expectations for the course and the assignment. Student sometimes is anxious about achieving a good grade, and the anxiety cannot be dealt with during class. IM posts' analysis suggested that the IM provided a platform beyond class time for students to voice their concerns and what to expect during the course. We also suggest teachers can provide scaffolding such as indexes, glossaries, formula sheets, templates, scoring rubrics, and samples via IM. Too little scaffolding can lead to frustration, anxiety, and loss of motivation. A teacher can also consider scaffolding individual assignments by requiring outlines or rough drafts. These intermediate steps of the assignments can be communicated and explained well after class by IM, too, especially when the class schedule is tight. However, based on the information presented above, the efficacy will be enhanced if the materials are simple and easy to understand.

Other teaching and learning scenarios that favor using IM in the course will be those pedagogy methods depending on the interaction, like group discussions or seminars. For example, this PI in one of the courses used an inductive approach to teach an ancient language (Biblical Hebrew), which encourages students to learn the language not by memorizing grammar rules but by exploring grammatic nuances from the standard texts (the Hebrew Bible). The project shows that IM is an excellent tool for this kind of pedagogy method.

Using IM on student engagement has two aspects that can enhance course satisfaction and outcomes. The first is that IM increases interaction between teacher and student and sometimes between students. This engagement occurs beyond the classroom as well as in it. As a result, this will create a continuous learning experience and boost the feeling of engagement. Secondly, this constant learning experience beyond the classroom includes cognitive and emotional engagement. Sometimes students inclined to share in the IM is because an emotional need is raised. For example, many IM posts we analyze consist of either anxiety about understanding course material and assessment tasks or excitement about discovering their learning. In other words, most of the time, there is an emotional ground for student posting in IM. This emotional reason has a beneficial effect that encourages the student to remain engaged throughout the course. This research suggests that

online discussion boards and teacher and classmate interaction dynamics can enhance students' emotional involvement in the course. Research has demonstrated that this has a positive correlation with course learning outcomes.

In the end, we expect this project can achieving our institutional goals of promoting lifelong learning ("nurturing lifelong learners as global leaders."). Because using IM in course teaching and learning enables the participants to adopt a mindset of learning beyond the course time and classroom setting.

9. Dissemination/Diffusion/Sharing of Good Practices: (please provide details under this section and the relevant summary statistics in the tables in Part IV)

The implementation of IM usage in course teaching has been demonstrated and promoted in the teacher's online meeting of the Chung Chi College general education course GECC4130. Furthermore, a mini-workshop for demonstration and promotion of m-learning and using IM in course teaching will be held in the coming faculty (face-to-face) meeting of the Divinity School of Ching Chi College.

10. Impact

One of the impacts to the teaching and learning by using IM in course teaching is that those who adopt a mobile learning mentality will extend their teaching and learning beyond the classroom and constantly notice new and situational subject material to deliver and share. Also, using IM in course teaching can put the teacher and students in a loop such that knowledge can be discovered in a collaborative atmosphere and not in a top-down manner. However, the degree of impact depends on various coefficients. For example, when we compare implementing a new pedagogy in a postgraduate course with an undergraduate faculty package course, the student's incentive or the teacher's readiness to extend the teaching outside the classroom are factors affecting the learning outcomes that could be better achieved or not.

We observed that highly motivated part-time postgraduate student is eager to respond to subject material delivered to their mobile device and their learning experience seems to be enhanced. On the contrary, non-major students with different learning objectives who enrolled in a faculty package course tend to be passive and act more like observers than participants, even if they are willing to join other activities.

11. External collaborations

No external collaborations for this project.

12. Engagement of students as Partners in the project (please provide details under this section and the relevant summary statistics in Table 5 in Part IV)

During the project, a junior research assistant graduate student participated in designing the integration of IM and LMS. She also supported the project's implementation by joining the course, distributing course

material via IM, synchronizing material between IM and LMS, and helping the students use IM in the course. In addition, the term-end survey is co-designed by her to help evaluate the project outcomes.

The graduate student facilitated the PI in dealing with basic routine, and she also provided perspective from the student/user side of the IM. It is a great help for the PI to design and evaluate the project's outcome. Her participation helped the PI by bridging the student subject and the project's objective as this PI is not the teacher of the course under investigation. The project could not achieve success without her contribution.

She takes part in both face-to-face lessons and the CURE1110 TG group. As a result, she may observe and reflect on the class atmosphere and students' answers. Furthermore, while PI does not teach the subject, she serves as a bridge for students to utilize TG. She believes that IM teaching benefits students' learning, but it will take time to develop a convenient system for teachers. IM learning may strain teachers in terms of time and workload, but a helper can lessen teachers' workload by responding to students' basic questions and conducting course administrative tasks. If IM is user-friendly for teachers, it is a win-win situation for both students and teachers. Furthermore, materials supply must be adequately planned and arranged.

PART II: Lessons learnt from the project

The students of a faculty-package course, mostly non-major in the course subject and still in their junior years, have a low incentive to extend their learning outside the classroom. As a result, even course instructors are reluctant to deliver more content after class, assuming that the students will be annoyed or indifferent to the learning. Although implementing IM in these courses is expected to improve such a situation, the truth is if the class participants, both teachers and students, do not adopt a mobile-learning mentality, IM as a tool could not exert its usage. Contrary to the PI's experience in teaching self-finance part-time postgraduate courses, the participants are highly motivated and view learning in the classroom as an extension of their life-long learning, not the other way around. They are ready to adopt a mobile-learning mentality and respond well to using IM to facilitate their learning, primarily represented in their eagerness to ask and respond to questions and materials they receive through their mobile device. The PI also teaches a class of college general education course every year. The course is in the form of a seminar, and the students are in their senior years. Classroom meeting is for them to present their project results, not where the teaching and learning happen. As the student group's "supervisor," I use IM to communicate and direct the group's project. We can also use IM during the classroom meeting to post immediate comments on the presentation, especially when we are having the meeting via ZOOM.

These experiences show that the effects of using IM in course teaching vary with the course scenarios. The determining factor for a mobile-learning pedagogy to succeed is the incentive and self-motivation of the students and the course teacher. If the participant of the course is ready to extend their learning outside the classroom, adapting mobile technology in the teaching and learning will make it easier to be effective and beneficial. Otherwise, the negative comment will arise due to the intrusive and constant incoming information flow. However, IM can still be used to manage the class administrative

needs such as reminding the due date or delivering the expected assignments. Our survey shows that level of participation increases when the course is near the end and when the assignments need to be handed in.

Most IM apps are free of charge, and students are already installed on their mobile phones for everyday use. Using such low-cost and standard technology can bridge the digital divide. Students from a weaker socioeconomic background may not have access to online material, and those less tech-savvy may not be using the technology to its full advantage or at all. Using IM apps in course teaching can overcome such situations.

This project's result indicates that to benefit from mobile technology in teaching and learning, incentive on extending learning beyond the classroom need to be cultivated. Therefore, it is suggested that a further study on how incentive and motivation for course learning will affect using mobile technology to enhance teaching and learning.

There is no question that face-to-face instruction is fundamental. However, because mobile devices are essential in students' lives, we can make meaningful use of them to improve the teaching and learning process. Furthermore, different countries' studies and our research reveal that IM can benefit teachers and students. Consequently, understanding how to use and integrate IM in the classroom is critical. Therefore, I focus on how to promote hybrid learning through mobile learning in developing a pedagogy guidebook to improve course teaching and learning.

PART III: Financial data*

(a) Funds awarded from CDG:	$ 54, 300.00
(b) Total expenditure:	$ 58, 362.50
(c) Surplus/ deficit (i.e. (a) – (b))	$ - 4, 062.50
In the case of deficit, please specify other source(s) and amount of funding secured (please specify: Research and Publication Project, Divinity School of Chung Chi College.)	$ 4, 062.50

Expenditure:

Item	Budget as per application	Expenditure	Balance
Student Helper	6, 300.00	6, 300.00	0
Junior Research Assistance	48, 000.00	52, 062.50	- 4, 062.50
Total:	54, 300.00	58, 362.50	-4, 062.50

* *Please attach the final/latest financial statement of your project as provided by the Finance Office*

and make sure that the amount listed above tallies with the relevant information as included in the financial statement.

PART IV: Information for public access

Brief write-ups of individual projects (should be submitted as a separate document, which will be attached to the University's Final Report for submission to the UGC) and other information under Part IV of this report will be uploaded to a publicly accessible CUHK CDG website.

1. Keywords

Please provide five keywords (in order of relevance to your project) to describe your project.

(Most relevant) Keyword 1: Instant Messaging
Keyword 2: Mobile Learning
Keyword 3: Telegram
Keyword 4: Hybrid Learning
(Least relevant) Keyword 5: Covid-19

2. Summary statistics

Table 3: Presentation (if any)		
Please classify each of the (oral/poster) presentations into one and only one of the following categories	**Number**	
(a) In workshop/retreat within your unit (e.g. department, faculty)	**On-line**	***Face to Face***
	1	*1*

Table 5: Engaging students as partners (if any)		
		Number
(a) participated in designing the teaching and learning resources	postgraduate students	*1*
	undergraduate students	
(b) participated in supporting the implementation of the project	postgraduate students	*1*
	undergraduate students	
(c) participated in evaluating the project outcomes	postgraduate students	*1*
	undergraduate students	