

COMPUTER LITERACY TEACHING USING PEER LEARNING AND UNDER THE CONFUCIAN HERITAGE CULTURAL SETTINGS OF MACAO, CHINA

Kelvin Wong, Ana Neves and Joao Negreiros
University of Saint Joseph, Rua de Londres, 16 – Macao, China

ABSTRACT

University students in Macao are required to attend computer literacy courses to raise their basic skills levels and knowledge as part of their literacy foundation. Still, teachers frequently complain about the weak IT skills of many students, suggesting that most of them may not be benefiting sufficiently from their computer literacy courses. This research proposes an enhanced framework based on constructivist principles by using peer-tutoring to increase cost effectiveness and to improve student outcomes. Essential to this proposed model is the training of former course graduates as peer-instructors to achieve high quality learning results. At Instituto de Formação Turística (IFT), a case study was used to evaluate its effectiveness using a qualitative analysis. In Macao, most students have a Confucian Heritage Cultural (CHC) background and the current findings demonstrate that students share more easily their learning difficulties within their group as their interpersonal relationships improve. It is suggested that since CHC cooperative learning is primarily based on bonds, students involved in this 'relationship-first, learning-second' type shared a larger amount of knowledge and social skills, a dual positive outcome. Moreover, English language is a major barrier for the understanding of the teacher's message to Chinese students. Meanwhile, the negative Western concept of plagiarism is replaced, under the CHC, as the 'face giving' and it is directly based on the relationship intensity to 'help friends'. At last, peer-tutors play a key role in the student increase internal motivation regarding the joy of the learning process.

KEYWORDS

Macao, Confucian Heritage Cultural, Computer Literacy, Constructivist Principles, Peer-tutoring

1. INTRODUCTION

Computer literacy includes a broad range of knowledge such as how to use word processing, spreadsheets, presentations and database software. Internet and online activities are also components of any typical computer literacy syllabus. Nowadays, information technology proficiency are perceived to be critical among employees (Murray, Sherburn & Pérez, 2007) and recognized as an essential skill in today's competitive job market (Grant, Malloy & Murphy, 2009). Therefore, universities should periodically update their IT curricula based on the recommendations made by IT experts (Kvasny, Joshi & Trauth, 2011). Besides this dogmatic practice and teaching alignment to comply with benchmarks recognized worldwide by the industry (such as ECDL, ICDL, CLAIT, Microsoft Digital Literacy Standard Curriculum and ISTE), there is also a need for a reshape of the education sector to nurture critical thinkers (Oliveira, Negreiros & Neves, 2015).

In Macao, there is no common curriculum for computer literacy courses. Different schools teach them based on their own established traditions within their institutional culture. Chan (1999) reported that Macao teachers typically use the traditional didactic approach to their students, so teaching staff and institutions can easily claim that undergraduates have acquired plenty of skills. This didactic approach is a teaching strategy in which apprentices are saturated with knowledge, content and exam requirements to strengthen their abilities in answering exam questions. Meanwhile, the results of 2012 and 2015 PISA tests (Program for International Student Assessment, a worldwide study by the Organization for Economic Co-operation and Development in member and non-member nations of 15-year-old school pupils' scholastic performance on mathematics, science and reading) show that students from Asian countries have the ability to score high (Kennedy, 2016) and they hold a CHC background.

In order to pass the exam, students generally rely on rote learning and repetitive practice – memorizing detailed actions to fulfill tasks. With this approach, students feel tired and reluctant to learn (Chan, 1999) and, hence, they can easily be cognitively overloaded (Cheung, 2006). There is a "high score, low ability" phenomenon, which is common among CHC learners (Wong & Wong, 2016).

At IFT of Macao, teachers use this didactic approach within computer classes. This includes written tests involving software exercises, Boolean concepts and decision-making skills related to this computer course. As learners usually perform well in these quizzes, educators believe that they have learnt the computer literacy proficiency and are prepared for the real world.

ISTE (2000) suggested that, although technology education has allowed students to gain computer skills, the effectiveness of learning is limited. A possible reason for this outcome is the fact that computer literacy training (CLT) is often not aligned with elements of realistic and authentic application. Even if students have this knowledge, they do not know how to transfer it to real life (Cheng, 2005). Chan (1999) reported that this authentic application of computer knowledge should be an objective for students but this target population does not seem to have met this goal. Chan (1999) also commented that the current learning approach typically used in Macao is not suitable for the fast-paced world of information technology of today.

Quite often, classes have forty or more students, so very little individual attention can be given to each single student to address his/her problems. One way of providing this high level of individual teaching cost-effectively is through the introduction of peer-tutors, which involves successful graduates from previous courses as instructors in successive cohorts of students. This approach would significantly reduce the teacher’s workload by employing less expensive teaching staff. Moreover, the opportunity to pursue a teaching career in the future would be a strong incentive for students to work hard and become successful peer-tutors. After all, peer-tutoring allows the development of critical thinking and improve confidence and interpersonal skills (Wong, Wong, 2016).

Taking into consideration this alternative teaching environment, Figure 1 shows that teaching staff are not necessarily the only source of learning and students are no longer the only source of feedback. With the introduction of peer-tutors, these could provide assistance to undergraduates and feedback to lecturers. Besides, English (as the official medium at IFT) can also be considered a communication barrier for Chinese speakers, particularly with fresh students, allowing peer-tutors on the Chinese-English conversion help.

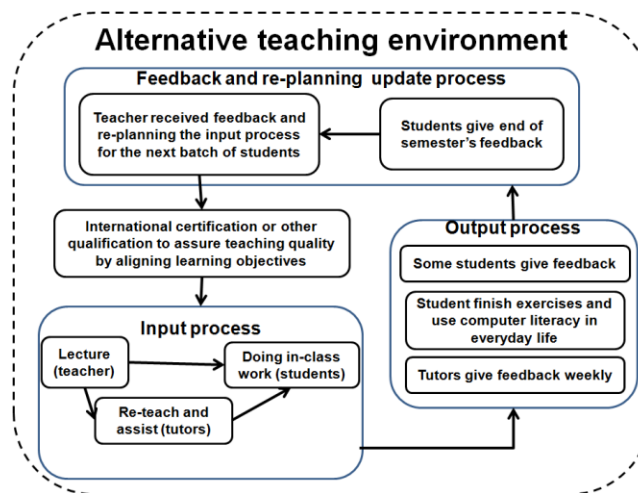


Figure 1. The Teacher as a Facilitator of Knowledge

The present research proposes an alternative classroom management to accommodate the specific needs of universities in Macao, in general, and IFT, in particular. Furthermore, it will add to our current knowledge the sense of developing and maintaining peer-tutor groups and validate ways of establishing small cooperative groups of students and tutors, who assist them and help the professor in monitoring the classroom. Finally, it allows learners to learn within teams while enabling professors to facilitate teaching and peer-tutors to engage into group discussions.

This article is divided into further five sections. The second one introduces the research questions, design and methodology of the present study while the pilot study is covered in section three. The cycle phases one and two are explored on the following two sections. Section six presents the first inferences, including the analysis of the research questions and its implications to the CHC environment.

2. RESEARCH QUESTIONS, DESIGN AND METHODOLOGY

Over the past decade, there have been an increase number of secondary school graduates entering higher education, particularly, in Macao. Many studies of cooperative learning and its effects on student achievements have taken place at various grade levels and in several types of educational settings in numerous countries (De Smet, Van Keer & Valcke, 2008). Peer-tutoring is also used by many teachers from as early as pre-school education up to the tertiary level (Slavin et al., 2003). Indeed, research shows that cooperative learning is an effective way for students to maximize their own learning and the academic accomplishments of their peers (Slavin et al., 2003). Furthermore, it allows students to boost their academic performance as well as their social-emotional skills (Davison, Galbraith & McQueen, 2008). Openness has been connected to creativity in the workplace, for instance (ETS, 2016).

This peer-tutoring program is innovative within IFT. Although the results of these numerous studies have been published, the combination of these two methods and its application in Macao are a novelty. It is also new to most undergraduates of Macao tertiary institutions who have spent their last 12 years studying under the traditional Chinese setting. Certainly, little research appears to have been written on what factors influence the learning growth in Macao.

The aim of this research is to analyze whether or not computer literacy training for CHC students can be improved but without a major increase of the financial cost of delivery. Together, peer-tutoring and constructivist principles offer a possible answer to this issue, which can be broken down into the following three research sub-questions: (1) To what extent might constructivist principles contribute to an improvement of the quality of teaching and learning in computer literacy courses? (2) To what extent might the effective use of peer-tutoring improve the quality of teaching and learning in computer literacy courses without significantly increasing the cost of provision? (3) To what extent might peer-tutoring based on constructivist principles improve the levels of student stimulus for learning in Macao?

The methodology consists of an intervention based on qualitative data. Therefore, it will be conducted within the so-called action research paradigm and based on the following five items:

1. Questionnaires will be used to gather data concerning affective issues of working in teams. Both closed and open questions will be included in order to verify the improvement process.
2. Participant observation will take form in the researcher's participation as a viewer, where the researcher's identity as an investigator will be openly disclosed.
3. Students' journals will be used to survey respondents' opinions, attitudes and views.
4. Semi-structured interviews will be held with focus groups to provide data on how people think and feel about the topics concerned in this research.
5. Grading of assignments.

2.1 The Particular Role of the Researcher and Peer-tutors

As said, the first researcher took the teacher's role in the class and as a participant observer, which means students were aware of the research project he was carrying out. As relationships were being developed between participants, perceptions and feelings on this teaching were shared among the different stakeholders. For reference, a total number of 130 students took part of this study.

2.2 Criteria for Selecting Peer-tutors

Two kinds of peer-tutors were required: senior peer-tutors (SPT) and junior peer-tutors (JPT). The first ones were selected from the pool of the second, third and fourth year students who had already taken this course successfully. JPTs were selected just before the start of the action research and based on their ability to lead each group in tackling problems within the class. The criteria for selecting senior peer-tutors were as follows:

(1) Peer-tutors must hold a Merit “B” level in the previous computer literacy course. (2) They must demonstrate confidence in teaching the subject. (3) They must have sufficient time available for peer-tutoring.

Twenty peer-tutors showed but only four were available to participate in the present experience. Afterwards, a brief training was given to them, mainly focused on the introduction of peer-tutoring concept, topics to teach and problems that they will encounter when giving guidance to students. Questionnaires were distributed to senior undergraduates (potential JPTs) in order to identify, allocate and verify problems. This computer literacy courses in IFT consist of two modules: Computer Application I (MS-Word, MS-Excel, MS-PowerPoint, MS-Movie Maker, Adobe Photoshop) and Computer Application II (Ecommerce construction site with Adobe Dreamweaver and Wix.com). Their learning aims are to equip students with the ability to handle IT situations which typically occur under the tourism and hospitality industries. These courses are compulsory for all first year students of IFT.

3. PILOT STUDY

The pilot-study was carried out between September and October 2014 with students for whom Chinese is their native language. Unwillingness to learn and a general feeling of boredom were, broadly speaking, the overall rule. Conceptually, peer-tutoring (system of using students to tutor other students), information (teacher's slides, handouts, recommended textbooks and web pages), scaffolding (process in which teachers model or demonstrate how to solve a problem, and then step back, offering support as needed) and learning via interpersonal relationships are possibilities of learning strategies. This last category entails a pre-requisite: the building of bonds within the classroom. There is a strong agreement that a basic trust relationship is one of the foundations for effective learning. As a result, a few students reported that neither they asked nor hold any form of communication with SPTs. Fortunately, all SPTs worked hard on building friendship connections by initiating conversations with students and actively helping them to overcome difficulties, thereby building a trusting connection.

3.1 First Inferences

The available qualitative data identify some issues encountered by learners during this computer literacy course:

1. Students rely heavily on using their mother language (non-English) as their sole learning medium as opposed of using English as the official teaching medium (most of the respondents favor being taught in their native dialect).
2. It is essential that skills and knowledge learnt during the computer literacy courses are applicable to real life circumstances.
3. As expected, the increase of the students' number requires a significant increase of staff and resources within limited budgets.

4. ACTION RESEARCH - CYCLE 1

In the first day, the teacher explicitly conveyed the course relevance to everyday problems and the development of future professional careers, the hands-on perspective. Background questionnaires were distributed to students concerning knowledge of computers, video making and presentation skills. SPTs and JPTs were introduced to the teaching approach, roles to play within the classroom and the assessment requirements. For each learning item written on the whiteboard, the professor urged SPTs to guide students with examples of real life cases.

Some pupils confirmed that although they did not contemplate themselves as experts on the subject, they considered themselves to be reasonably proficient in handling software. In fact, some students claimed that they had programming knowledge, although this matter was not contemplated during this module. Others felt the syllabus was of little demand and, thus, asked whether they could drop the course or get exempted because they perceived it as a waste of time, as the following quotations depicted in Table 1 illustrates.

Table 1. Students' Feedback at Research Cycle 1

"Why am I learning this? I have learnt it since primary school!" - Student (1)
"Do I have to take this course? It seems a waste of time for me to study Word, Excel and PowerPoint. I can even do programming with Java, Visual Basic and C++!" - Student (3)
"My school required me to focus on how to create nice graphics, how to submit homework online and even learn how to do programming, which I didn't have a clue of what the heck that was (even now). But whenever my friends and I stand in front of a computer shop thinking of buying a notebook, we felt computer ignorant." - Student (9)

5. ACTION RESEARCH - CYCLE 2

From the lessons learnt from Cycle 1, all participants were invited for an informal lunch in IFT. According to the Chinese culture, banquets are central for developing relationships ("guanxi") or connections. This is a common and well known practice in the Chinese community. Meanwhile, the teacher changed the students' learning group size. This allowed the participants to work with smaller groups where the leader from each team was appointed as JPT. SPTs helped in group selection and discussed the distribution of their responsibilities among groups. A stronger emphasis was put in place on using a relationship approach based on quality of improvements among the students. This technique recognizes the bi-directional nature of bonds (Rose-Krasnor, 1997), that is, confidence promotion and self-respect, established effective contacts and taught students how to work between groups and independently (Pearson, 1999).

In Cycle 2, a different assignment was required: production of a short video clip. Although any topic related to a specific aspect of Macao was suggested, students were free to choose their own type of video (documentary, historical, comical, love-story...). This allowed a tremendous freedom for stimulating their creative thinking. The professor allowed them to remain on campus during class hours to complete their task with their group and the corresponding JPT and SPT. Other than that, they were allowed to use their own personal computers so everything they accomplished became a personal experience for and by them.

Similar to the first cycle, JPTs and SPTs held a briefing before the start of this cycle. Both JPTs and SPTs strove to maintain harmony (Gabrenya & Hwang, 1996) and a positive peer-relationship (Lee et al., 2004) with the students. JPTs' initial tasks were to keep students working on the project, which involved selecting a video topic, title, storyline, casting, editing and assignment preparation for submission. Through discussions, SPTs and JPTs used their own expertise to solve on-going difficulties. Using conflict resolution strategies, SPTs and JPTs were able to address positive outcomes or mitigate relationships damage, which, in turn, could have affected the learning motivation factor.

Students' journals contained written notes about emails and online forums or verbal comments made outside of the class time about the different topics of the subject. Daily entries were classified under the following three leadings: (a) Evaluate your friendship with your group mates including SPTs; (B) Reflection on learning goals; (C) Evaluate your learning. When compared with their first remarks of Cycle 1, the amount of feedback had increased from 13 to 25 and a major pattern could be found: the shift from extrinsic to intrinsic motivation.

Table 2. Students' Feedback at Research Cycle 2

"Students-teacher is helpful and cool! The knowledge is useful. He told us how he uses the software on his work and life. It seems quite important." (Student 29)
"Please, ask senior peer-tutors to teach other topic." (Student 6)
"Kindly, find more helpers. We need them." (Student 14)

As illustrated on Table 2, students highly appreciated the guidance from SPTs. As well, students reflected on how different software may fit their life-styles: "Respectful teacher, I was brought up in a Mainland Chinese community and I have learnt a lot about the need to honor and obey parents' expectations. I didn't want to come here to study. At first, my only wish was to take this degree to honor my dad. My relatives have already planned my future after my graduation and I know I will get a good job. So, I just need to get high marks, go back with my first honored degree and nothing else. After I've known my classmates better, especially SPTs, and through this share of experiences, my horizon has been broaden by knowing how people

work outside of China and how to use different software for my everyday life (and not just to get marks). Studying here became more enjoyable and meaningful." (Student 18)

This quotation highlights an aspect of the traditional Confucian Heritage Culture: The intrinsic interest of the student learning was enhanced by three factors, that is, SPTs' encouragement, collaborative learning with classmates and the relationship among the participants (including the teacher). In fact, some students even admitted that they should have this teaching approach in all IFT classes. However, two students worried that their lack of experience might have weakened the group's overall performance, which could have damaged their relationships with other students during their team work.

SPTs also participated in the video production by guiding them through the process of thinking, planning and acting and on the hands-on experience. Meanwhile, JPTs were busy on administrative work, i.e., arranging meetings, deciding discussion topics and showing students how to proceed, especially in editing videos.

Table 3. Added Comments of Students

"I taught them how to edit the video for their personal work. One student had problems with the software in his computer, so I helped him. I edited some of the project videos while the remaining colleagues did other stuff." (Student 11, JPT)
"I have done my personal tutorial with the student teacher's help because our group had only five people. So everyone had to do something to help to finish the job. It was fun. We became good friends." (Student 16)

In this cycle, the students expressed their feelings more openly. Their emotions ranged from initial concern to increased interest. The pupils that had shown signs of anxiety replied to the teacher's email with encouraging words: "Last night, I watched my own video with my group and I nearly cried of happiness. I never thought I could make a video so nice. The group leader and others helped me very much. I made many mistakes but they forgave me with jokes." Other students placed high value on the quality of their relationships: "I don't want the SPT to leave. I missed them. They had been extremely kind and helpful to our learning process. I hope that they can be with us in the next semester." However, one particular student worried about the future: "I am sorry sir, the class was great. I did fine. Thanks. But will you be here teaching next year? Will the senior peer-tutors be here with us? I am worried that if they don't come I may not do well." (Student 22).

6. CONCLUSIONS

6.1 Research Questions

6.1.1 To What Extent Might Constructivist Principles Contribute to an Improvement in the Quality of Teaching and Learning in Computer Literacy Courses?

This program of study pioneered an enhanced one in Macao where students no longer mainly gain knowledge and experience through the professor's direct influence or guidance in class, but through using their own experience developed in partnership with peer-tutors, teachers and classmates. The traditional learning approach involves students learning content by examinations, presentations and quizzes, mainly. This often reduces their motivation to learn, although there is evidence that students hold a higher motivation if their learning is based on authentic experiences of real life issues and shared ideas within their group. Therefore, students receive more interpersonal experience from the group members (who they had learnt to trust and with whom they had built new learning relationships). This happens because of the CHC group dynamics, whereas the emphasis was put on the student activity and cooperative work. With highly collaborative efforts, stronger motivation and incentive for learning, students achieve higher course results. Moreover, when cooperative work is based on relationships among Chinese students, their collaborative assistance is sustained throughout the course.

6.1.2 To What Extent Might the Effective Use of Peer-Tutoring Improve the Quality of Teaching and Learning in Computer Literacy Courses Without Significantly Increasing the Cost of Provision?

With the rapid development of Macao, an increasing demand for computer literacy skills training, staff and hardware can be expected. To control this situation, two components should be stressed:

a) Computers and their peripherals: These require constantly updated software as well as the latest hardware state-of-the-art, which always add significant costs to any institution's budget. Yet, students can use their own laptops instead. Hence, no additional cost is accrued by the university with the exception of printers and Internet access, for instance.

b) Teaching staff: The increasing number of students would require the hiring of more teachers. Besides, they reported that they were unable to adequately meet the individual needs of every student in class, despite their hard work. Using the peer-tutoring strategy advocated here, universities gain the freedom to hire tutors and allow, at the same time, more flexibly for professors to do research and work in additional university projects.

6.1.3 To What Extent Might Peer-Tutoring Based on Constructivist Principles Improve the Levels of Student Motivation for Learning?

According to this experience, this index has increased significantly (although it was not measured quantitatively) with an intensive shift from a surface to a deeper approach towards content knowledge, revealing that students became more interested on the subject and by being able to relate computer literacy content to their personal needs.

6.2 Implications on Teaching Practice

Under the CHC setting, teaching requires a professor that understands the need for inter-personal relationships, which should be firmly established before cooperative learning takes place. Additionally, these bonds should be developed continuously, requiring teachers to be aware of how effective interpersonal contacts can be encouraged and sustained within the class. According to Stankov (2010), CHC is an unforgiving culture, where only those who work hard deserve the highest marks attained in examinations. These findings advocate that CHC educators should exhibit similar behaviors towards their students. In fact, evidence gathered during the present study suggest that CHC teachers regard students' lack-of-response as a student's own problem and not a result of weaknesses in their own pedagogy. These lecturers believe that students who work harder are willing to ask questions (both in-class or after class), thus, deserving better results. They do not appreciate the fact that, without having a first established inter-personal relationship, undergraduates are quite reluctant to start expressing their learning difficulties.

The current findings also demonstrate that students share more easily their learning difficulties within their group as their interpersonal relationships improve in a beneficial way. It is suggested that since CHC cooperative learning is primarily based on relationships, students involved in this 'relationship-first, learning-second' type shared a larger amount of knowledge and social skills. Particularly, when some bonds reach a close level and one of the participants holds a low knowledge and skill rank, the other party is more likely to do the work for him/her, allowing the weaker student to copy the work from the strongest in an attempt to extend that familiar relationship. This action, under the CHC, is usually known as the 'face giving' and is directly based on the bond intensity. However, from a western point of view, such action is known as plagiarism. If plagiarism holds a negative connection, the disguised 'helping of friends' represents a positive one, a distinction which has characterized CHC society since ever. According to the CHB requirement, 'face' must be well kept especially when in front of an outsider. So, 'your best friends must help you if you are in real trouble',

Yet, the distinction between Meng's ideas, a Chinese Master student in Engineering in the UK, was stated by Gu and Brooks (2008) regarding plagiarism: "I am not quite clear where to draw a line to distinguish my ideas from other authors' ideas. For example, I read a book and had some ideas of my own. So when I write, maybe half of the sentence is a summary of the author's ideas whilst the other half is about my new ideas drawing upon the ideas in the book. Should I make a reference to the book? It was a real headache for me because I felt that actually my ideas were integrated with someone else's. At present I do indicate the original

sources in my essays. But I feel that it seems that my own new ideas have become somebody else's. I find that quite difficult and don't know what to do." Meng's remarks raise the question of whether a lack of citation should simply be considered a transgressive act. According to both authors, beneath the surface act of adding references to the original textual sources was his genuine attempt to demonstrate his intellectual contribution, as well as his commitment to academic integrity.

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