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Extreme-Teaching-2 (XT²): Evaluation of an Innovative Semester-Long Intensive GTA Training Program Based on Microteaching

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Microteaching techniques have been used for teacher training since the mid 1960s. Despite its usefulness, as affirmed by pre-service teachers, in-service teachers, and graduate teaching assistants (GTAs), there are numerous criticisms on the shortcomings of microteaching activities. Specifically, it (a) oversimplifies the classroom learning and teaching nature, (b) encourages skill modelling on one or only few technique(s) demonstrated during training sessions, (c) involves costly human and technical resources for implementation, and most critically, (d) fails to provide instant and reusable feedback to improve classroom teaching skills. Addressing the inadequacies of traditional microteaching practice, this paper proposes an Extreme-Teaching-2 (XT²) framework based on the computer science literature. Originating from Extreme Programming (XP) methodology, XT² preserves the agility on teaching-feedback-teaching cycles with heavy peer and instructor involvement. With strong technological support, XT² allows specific, personalized, incremental, and constructive formative feedback to be given by peers and instructors during and after two classroom observation sessions. Through the XT² framework, teacher candidates are able to reuse feedback instantly (feedforward) and rapidly improve (a) confidence in identifying their weaknesses and strengths, (b) and their facilitating skills, while the administrative workload on instructors is significantly reduced.

The Co-Teaching Model

Studies show the importance of training graduate students before they start their teaching as graduate teaching assistants (GTAs) at university (Castley, 2005; Park, 2004; Prieto & Meyers, 2001). A plethora of mandatory learning and teaching courses have blossomed in the last two decades in most of the universities around the world to address this critical issue. On one hand, the benefits of GTA training are obvious: improved confidence (McClure, 2007), a better graduate experience (i.e., satisfaction, motivation; Park, 2002), connection between theory and practice (i.e., alignment; Hardré, 2003; Sweeney, 2003), improved learning and teaching (Hardré, 2003), better future rapport with students (Rushin et al., 1997), etc. On the other hand, systematic GTA training is often ignored or not prioritized. Lack of interest in learning and teaching (students and faculty) as well as time constraints to coach or supervise GTAs are also frequently mentioned in the literature (Kurdziel, Turner, Luft, & Roehrig, 2003; Torvi, 1994). In line with the literature, we are aware that GTAs play an increasingly important role in university education (e.g., Seymour, 2005), and we believe that there is a need to design customized components of learning and teaching courses to help them deal with classroom challenges. Thus, the main objective of this paper is first to address the difficulties faced by GTAs and then to propose a pedagogical framework accordingly. Particularly, we build on microteaching in the education literature and extreme programming (XP) methodology in the computer science literature to propose the Extreme-Teaching-2 (XT²) model, which emphasises the critical importance of fast teaching-feedback-teaching cycles.

Literature Review

Contemporary university teaching is rapidly changing in nature: tertiary institutions are faced with constricting budgets (Piatt, 2011), and the role of GTAs is becoming more prominent in undergraduate education (Piatt, 2011; Travers, 1989). The introduction of outcomes based approaches (OBAs; Biggs, 2003) has also revolutionized teaching. While traditional teacher-centered models focus on content delivery, OBA models emphasize student-centered learning, formative and timely feedback, and alignment of learning outcomes, activities and assessment. In contrast, GTAs are not always trained to teach in their discipline or use OBAs. Only 40% of the institutions surveyed in the US, for instance, offered a training course to new GTAs (Torvi, 1994). These training courses, however, were not necessarily mandatory and vary greatly in terms of length and content (Luft, Kurdziel, Roehrig, & Turner, 2004). Table 1 presents a list of challenges faced by first-year GTAs (Mark, Thadani, Santandreu Calonge, Pun, & Chiu, 2011) and possible solutions to overcome these.

Numerous attempts, such as microteaching, have been made to address the issues that newly recruited GTAs have to face. The aims of these attempts are to develop pedagogical foundations, shape the instructors' role, and improve GTAs' instructional skills. However, current mechanisms do not seem to respond to the changes rapidly enough. Torvi (1994) and Fox et al.

Table 1
List of Challenges Faced by First-Year GTAs and Respective Solutions

Challenges	Solutions
Absence of prior instructional experience and guidance on classroom teaching (Bomotti, 1994)	Early training in the pre-service stage (Park, 2004) to reduce anxiety and fear
Balancing the complex role of teacher and student (Rubin, 1993)	On-going training to establish GTAs' development as instructors (Drake, 1997)
Change perception on teaching as solely content delivery (Menges & Rando, 1989) to OBAs	Assessment and timely feedback to GTAs, reflective inquiry to foster paradigm shift (Brown, 2003)
Using English as medium of instruction (MOI) for non-local GTAs (Marvasti, 2007)	Asynchronous web discussion for building up confidence on using English (Mark et al., 2011)
Local cultural awareness for non-local GTAs (Marvasti, 2007)	Cultural training courses to enhance non-local GTAs' abilities to relate to local students and to use relevant examples in the classroom (Marvasti, 2007)

(2011) assert that the two most common reasons for many institutions not to offer formal GTA training were the lack of interest from the departments and students and time constraints. GTAs generally cannot fully utilize in-service training that was provided just weeks before they began teaching (Drake, 1997). Also, didactical feedback from faculty on effective class practices and discipline-specific instruction is often not available (Fox et al., 2011; Luft et al., 2004). Providing effective training that is instantly useful to the GTAs and academic departments is therefore vital.

Microteaching: Definition and Shortcomings

Over the past decades, literature on teaching techniques has been dominated by studies on microteaching (Gliessman, Pugh, Dowden, & Hutchins, 1988). This line of research provides supports necessary to help novices learning from simulated practice and benefit from feedback (Grossman & McDonald, 2008).

Microteaching is defined as a "performance training method designed to isolate the component parts of the teaching process, so that the trainee can master each of the component one by one in a simplified teaching situation" (McLaughlin & Moulton, 1975, p. 9). Along with this definition, Allen and Ryan (1969) suggest that microteaching is the "real teaching" conducted in small partition and practiced under controlled conditions. A junior teacher often reflects on his "real" performance with peers, senior colleagues and students through reviewing a video taken during a lesson practice. A traditional microteaching cycle suggested by Singh and Sharma (2002) involves seven steps and is summarized in Table 2.

Perceived as useful by both pre-service and in-service teachers over decades, microteaching helps teachers to improve content delivery and structure, acquire and practice simple teaching techniques such as how to engage students in the classroom or how to answer challenging questions, and develop (self and peer) observation and self-reflection skills.

Critics of microteaching highlight the fact that the cycle of teach, critique, and re-teach (Figure 1) has limitations: (a) it is rather rigid and too short; (b) it does not always foster reflection on practice due to a lack of constructive briefings with a clear set of criteria (and detailed session plan provided by the student) and debriefings, and limitations such as peer observation of teaching, especially when done for the first time and only once (e.g., lacking confidence in using assessment rubrics), and absence of a second distinct presentation to review "glitches" that occurred in the first presentation (i.e., feedback) and apply changes to a new one (i.e., transferability, feedforward); and (c) it is not as complex as the "real deal" and therefore does not really prepare them to teach. The main reason behind the inadequacies of microteaching lies in the incomplete (but essential) components of many teacher-training courses (design) in which microteaching forms a large part of the training process.

Agile Practice: From Software Development to Teacher Development

The inexorable changing nature of tertiary education worldwide requires experimentation in curriculum development and in pedagogy. It also requires to think of news ways to deal with new situations: an unprecedented international, mobile and digital-native student population, larger class sizes, satellite campuses overseas, the preponderance of social media sites and e-technologies to access knowledge and interaction (Cable & Willetts, 2011).

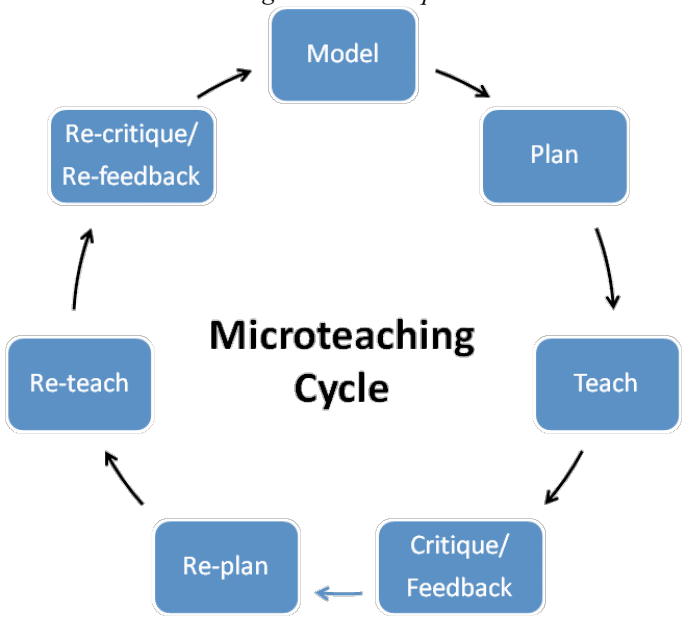
The fact that graduate students who undertake "teaching training" are better equipped to support learning, assess their students, engage and inspire them inside and outside the classroom is unquestionable (Mahoney, 2011). The debatable part, however,

Table 2
Traditional Microteaching Cycle Involves Seven Microteaching Steps

Step	Explanation
Step 1: Modelling the skills	The modelling of the skills is mainly done through two models: 1. Perceptual model: presented by way of demonstration and is visually perceived by trainees 2. Conceptual model: presented in the form of written material and is conceptualised by trainees
Step 2: Planning a micro-lesson	A lesson of a short duration, usually of 10 to 20 minutes, is planned in consultation with trainers
Step 3: The teaching session	The plan is then executed in the presence of the trainers; the session is video-taped
Step 4: The critique session	Concrete and specific feedback is then given by the trainers for improvement; video taken during the teaching session is reviewed
Step 5: The re-planning session	Trainees re-plan the session based upon feedback received
Step 6: The re-teaching session	Trainees deliver the same lesson again
Step 7: The re-critique session	Trainees receive critique again for the re-taught lesson

Note. (Singh & Sharma, 2002)

Figure 1
Microteaching: Teach-Critique-Re-Teach



concerns the stiffness of many of the training courses offered (e.g., difficulty inducting new staff and add new features anytime) and their disconnection from (a) the realities of the 21st century classroom (e.g., fast-paced, video-recorded, "blended"), (b) the advanced technological background of the participants, and (c) what GTAs really need: multiple opportunities to practice, constructive and extensive feedback that will help them to improve, extra chances to provide feedback to their peers, either online or face-to-face, and choices (reflection), not "model answers or techniques." Methods such as microteaching are not adapted to these fast changing new situations. However, methodologies in computer science literature (e.g., agile programming; Thomas, 2005), give a possible clue to design quick and effective GTA training programs that embrace changes and are instantly useful to develop valuable IT artifacts (Hevner, March, Park, & Ram, 2004) that suit customers' need through extensive user feedback.

The introduction of agile values and overall agility into a teaching team and a learning and teaching course for graduate assistants addresses most of the issues presented. Lui and Chan (2008) provide explanations for five "agile values"—communication, feedback, simplicity, courage, and respect—for positive attribution to people and products in software development (Beck & Andres, 2005). Table 3 presents a summary on how agile values are applied in software development (Beck & Andres, 2005; Lui & Chan, 2008) and how the course SG8001 adopted it for GTA development.

Incorporating Agility and Adaptability into the System: Extreme Programming

Beck (1999) asserts that traditional software development cycles cannot "adapt to changes" because the cycles are lengthy. Traditional software development methods adhere to a "strict sequence of requirements analysis, design, and development phases" (Larman & Basili, 2003, p. 48), and are often criticized as "unrealistic" (p. 52). The most significant impact of this strict sequence is the lack of real-time review and feedback (RtRf) to improve the software. RtRf allows programmers to make quick corrections and to produce robust artifacts that are truly user-centric (Wiegers, 2002).

Agile methods have been introduced to address the inadequacies of traditional software development methods. XP, among other agile methods, focuses on social changes in a fast pace.

Research Design of the Extreme-Teaching-2 (XT^2) Model

Using XP methodology, particularly timeboxing and multiple checkpoints, the investigators transformed the concept of microteaching and integrated it into a compulsory and intensive learning and teaching course for GTAs in Hong Kong. Timeboxing allows for the seamless introduction and quick integration of changes/updates within the course, while multiple checkpoints are vital to stop and reflect, gauge progress and learning, and modify content if necessary. Both concepts involve all parties.

Table 3
Mapping of Agile Values

Agile Value	Software Development	GTA Development
Communication	Cultivating knowledge sharing culture among programmers	Sharing of experience and practices between experienced teachers and GTAs (Park, 2004). Communities of Practice (Wolf, 2009)
Feedback	Feedback is needed at all stages during development. True value is delivered only when the changes are reflected in the software.	In-class (service) presentation feedback is provided longitudinally during training and post-training classroom teaching (Leach & Conto, 1999)
Simplicity	Multiple simple solutions to solve a complex problem: *building software for today's needs*	Adoption of online interaction and video recording strategies (Fukkink et al., 2011), and development of a multi-directional engagement (MDE) technique with a multiple point- [formative and summative / peer] feedback system to maximize learning, boost motivation and encourage collaborative learning and reflective discussions on Learning and Teaching (Wilson & Stacey, 2003)
Courage	Changing existing code for the better requires courage, enthusiasm, and belief of the programmer	Adopting innovative technology for improving Learning and Teaching requires courage and peer support (Kankaanranta, 2001)
Respect	Mutual respect in the programming team is essential to motivate the team to enjoy new challenges and make new achievements	Constructive group (peer) discussions of, and reflections on, the issues can provide a format to build team collaboration, share good practice and develop skills in working together effectively (Groom, 2006)

Participants, Materials, and Procedure

The SG8001 mandatory course for teaching assistants from all disciplines is taught from the end of the summer semester through the end of June at two locations, Hong Kong and Suzhou (Mainland China). The 144 Students in the course were between 22 and 35 years of age. All of the postgraduate students were full-time students from Mainland China (two-thirds), Hong Kong and overseas, with no prior or limited teaching experience and no particular interest in learning and teaching. To familiarize students with the online environment and specifically the online discussion board, students introduced themselves in an online task where they outlined their motivation for the course, assets (e.g., teaching experience, program of study, year), and liabilities (e.g., lack of relevant coursework, pre-existing subgroups), which was crucial information for the formation of interdisciplinary groups for in-class activities.

The session content of SG8001 aligns with different components as postulated in the literature, including cultural awareness, language proficiency, and practical personal and professional development skills. Table 4 presents these five components and the corresponding content in each session.

XT² gives participants the opportunity to (1) actively engage with feedback, (2) develop and improve their presentation as well as self and peer evaluation skills by observing their own teaching session and those of their classmates' via video recordings (Hargie, Saunders, & Dickson, 1994; Star & Strickland, 2008), and (3) provide both formative oral feedback in class and written formative feedback through online discussion boards, as well as summative feedback through online Blackboard organization tools (Hattie & Timperley, 2007). This crucial information from various sources is then analyzed by students and incorporated into a reflective portfolio submitted one month after the end of the course to foster deeper reflection and maturity.

Table 5 presents the mapping between the agile methods used in XP and the XT² model designed for the SG8001 course (i.e., what has been borrowed and why). Figure 2 describes the two cycles used in the course.

Description of the XT² Model

The XT² Model provides a fast briefing-teaching-feedback-debriefing-training-teaching-feedback debriefing cycle with heavy peer and instructors' involvement. The mechanism of XT² involves two cycles on managing and designing a mock teaching session with a corresponding practice embedded within each cycle (as shown in Figure 2). In the first mock teaching session cycle, the purposes and outcomes of the activity are explained to GTAs, but no further information is provided at this stage. Immediately after their first delivery (multi-disciplinary group), feedback is given to the students, including (1) an explanation of the rubrics (open discussion), (2) formative oral feedback from the teaching team, (3) formative peer feedback, and (4) debriefing. These comments aim to induce GTAs' reflection on their future teaching (feedforward 1). Peers then could engage in formative feedback online (discussion board). In the second cycle, the GTAs are prepared with a workshop that includes various proven presentation and active class engagement techniques, explained (assessment) rubrics, and comments received in the previous cycle. Students are asked in groups to reflect on the techniques as well as on the comments and deconstruct their individual presentation to identify areas for improvement. Likewise, timely feedback is provided after the second teaching activity, including

Table 4
Session Content

Component	Session Content
Cultural awareness/Context	Context for learning and teaching at City University of Hong Kong, City University of Hong Kong's student profiles (entry/graduates'/employers' surveys)
Language/Instructional techniques/Active learning strategies/Course development	Presentation and facilitation skills, engaging use of multimedia in the classroom, analysis of outstanding speakers' presentations (e.g., TED lectures, YouTube, large audience, small groups)
Practical skills/Engaging students outside the classroom	E-learning/e-technologies (e.g., echo360, Blackboard, Twitter), four-year curriculum issues (to be launched in 2012)
Personal/reflective skills	Reflective e-portfolio one month after the end of the course, including a teaching philosophy statement
Professional Development Skills/Peer review/Assessment	Integrating learning theories into teaching using an outcome based teaching and learning approach, obtaining feedback from teachers and peers, analysing it to improve

Table 5
XP and XT²

XP	XT²
1. Planning Game 2. Small releases 3. Refactoring: • The main planning process • New releases made often • Continuous design improvement	The SG8001 team brainstorms continuously to improve content and delivery. Tiny refinements, small modifications are incorporated almost instantly (timeboxing) • Kaizen□善 process (Wittenberg, 1994) • Continuous integration
Customers decide the scope and timing of changes	Scope: Students are involved in many phases of course content, decision-making and assessment. (Malone & Lepper, 1987; i.e., practice: presentation 1) Checkpoints Timing: Peers have to release feedback within 24 hours; they can choose to release it immediately or not.
The design of the system is evolved through transformation of the existing design	Course cycles: Small iterations mainly done in Cycle 2, at the preparation workshop (parts are added/removed depending on, e.g., how many GTAs teach labs). Inducted invited speakers share their insights. Online activities/videos and/or additional research papers are added to/removed from the system (timeboxing), depending on the audience (majority of scientists, lawyers, etc.).
Pair Programming • Code is written by two people • New people spend the first couple of iterations just pairing with more experienced programmers	• Summative assessment (and cross-checking) is always done by two instructors • New people joining the team are paired with one TA who has taught the course (Andersson & Bendixa, 2006), and spend the first "two cohorts" observing class interactions (multi-directional engagement technique), and discussing with the team about L&T issues relevant to the course (checkpoints)
1. Collective ownership and 2. Just rules Every programmer improves any code anywhere in the system at any time. The team can change rules at any time as long as they agree on how they will assess the effects of the change Intense social activity Encourages members to take chances	Every teaching team member (TAs included) teaches every individual part of the course. Agreement is sought before each session (email). Any member of the team can also modify any part of the content or in-class/online activities (timeboxing) at any time (checkpoints), as long as he/she can justify it and explain the outcomes of the activity and its alignment with the content of the course to the team. • Everyone participates in all development parts • Stimulates collegial collaboration, share of different expertise, creativity, dialogue

summative written feedback from the teaching team and peers. GTAs also have access to their own video recorded session as well as their peers' sessions to foster deeper reflection (feedforward 2).

Advantages of XT² Over the Traditional Microteaching Method

With the XT² Model, GTAs receive both formative and summative feedback from the teaching team as well as peers (Figure 3). Formative feedback is provided right after presentation 1 and at the beginning of cycle 2 where presentation techniques (e.g., workshop) are presented to GTAs. Active learning strategies are employed in the preparation workshop, and students are constantly engaged, both in class (using the MDE technique; Santandreu Calonge, Chiu, Thandani, Mark, & Pun, 2011) and online (discussion board), to facilitate the understanding of student-centered learning pedagogy. Summative feedback is provided to GTAs at the end of presentation II, again from both peers and

Figure 2
Description of the Cycles Used in XT²

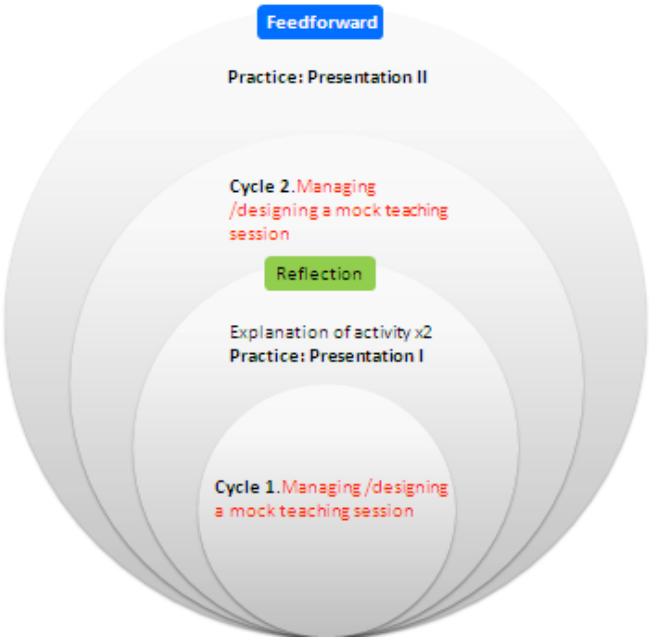
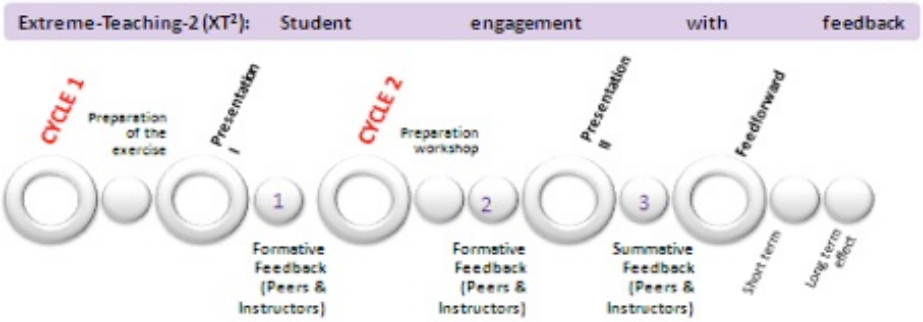


Figure 3
Student Engagement with Feedback



instructors. Multiple levels of summative feedback are used to forge GTAs' improvement; they include:

1. Debriefing by the instructors and peers immediately after the presentation to address the key issues that arise during the presentation (or to reinforce good facilitation). This brief immediate feedback often provides a long lasting effect on students' learning as they pay much higher attention to instant feedback, as compared to later feedback, to see how well they perform in their first presentation.
2. Written feedback by the instructors based on the preparation workshop materials to provide GTAs a formal response on their teaching, according to the taught materials. Written feedback must be given to students within two weeks after they have conducted their final presentation to avoid fading of memory and discontinuity of the assessment process.
3. Peer assessment by students with diverse backgrounds to provide feedback to GTAs about their achievement in the presentation. It enables GTAs to see how their teaching materials are delivered to "students" and to improve based on their perspective.
4. Recorded presentation videos are provided to GTAs so that they can revisit their class

session and verify their strengths and weaknesses as described in the written feedback. This verification process can help to reinforce their presentation skills and identify and correct their shortcomings.

The feedback cycle in XT2 is quick, flexible, and intensive, and GTAs have the opportunity to reflect in a timely fashion. In order for feedback to be the most useful and effective for students, research shows that the most critical factor is timing (Bangert-Drowns, Kulik, Kulik, & Morgan, 1991). This fast pace of feedback also addresses Coldevin's (1988) and Thakrar, Wolfenden, and Zinn's (2009) concern about the flexibility and rigidity of the traditional microteaching method.

Another distinctive improvement of XT^2 over microteaching is that GTAs do not repeat the same lesson they taught in the cycles. Instead, they reflect on their received feedback at the end of cycle 1, as well as techniques taught in the preparation workshop, to prepare another lesson in cycle 2. It gives GTAs opportunity to digest the feedback and materials they learned in the workshop, analyze and reflect, and apply them to the next lesson. XT^2 method enables GTAs to apply feedback and techniques obtained from cycle 1 instantly to cycle 2 where the first presentation serves as a pre-test to the GTAs to find out their initial teaching performance.

Effectiveness of XT2 on Student Learning

The XT^2 model tackles the weakness of microteaching by introducing two cycles of mock teaching (i.e., presentation with different topics) and rapid feedback from peers and instructors. The first cycle serves as diagnostic test to check out the initial performance of the GTAs. A debriefing session then helps students deconstruct and analyze their presentation, with feedback from their peers and the instructors; the teaching team can, at any time, adjust the materials according to the GTA's level of expertise. It provides an instant snapshot of each cohort of students. The presentation skills workshop can then be modified accordingly.

The effectiveness of cycle 1 alone may be debatable, but GTAs get a chance to carry out a teaching activity (since not all of them have teaching experience) before being assessed to release tension and to allow self-reflection, and they have an opportunity to observe other students' initial teaching. After GTAs complete cycle 2, the facilitation and presentation skills of each individual is compared between the two cycles. The first one serves as the baseline, and the second one is an indicator of what they learned through the course. It provides solid evidence to both the teaching team and GTAs on the effectiveness of the course. The availability of two rounds of practice helps to reduce GTAs' fear and anxiety, simply because they have more chance to practice their teaching skills under guidance while receiving feedback. The more they practice, the less anxious they feel, which fosters greater improvement.

XT^2 also increases students' conscious awareness of the importance of obtaining feedback and the critical importance of its timing and frequency. In the traditional microteaching method, trainees receive feedback only from the trainers and on the same lesson twice. Although it can improve some aspects of the same lesson, it lacks instant and transferable feedback. From the XT^2 model, GTAs receive strong and intensive feedback to improve their performance. When GTAs complete the course, the necessity of providing feedback to students becomes part of their normal teaching activity. With the intense feedback cycles in XT^2, GTAs evolve from unconscious incompetent to conscious incompetent, then to conscious competent and finally unconscious competent (the four stages of competence learning model) of teaching with feedback. The XT^2 model also helps students build up intention for continuous improvement, which is an essential element of their future teaching duties.

Results

To evaluate the effectiveness of XT^2 on student learning**,** the teaching team collected both quantitative data and qualitative analysis. In the quantitative analysis, Learning Experience Questionnaires (LEQs) were administered to students anonymously at the end of each course to elicit feedback about their experiences with this innovative learning approach. The team also administered an additional survey, the Teaching Feedback Questionnaire, to gather feedback on the teaching strategies used. Fifty-nine students (of 102 enrolled; a 57.84% response rate) in the required course in Hong Kong completed the LEQ surveys. Thirty students (of 42 enrolled; a 71.43% response rate) completed the TFQ survey. The results of the study, therefore, are based on 89 responses. Both questionnaires were administered a few weeks after the end of the course. The low response rate could be explained by the facts that many of the students went back to the mainland immediately after the course and had limited access to City University's server, and the Hofstede (2001) power distance index still influenced their giving feedback to a professor/superior behavior, as teachers' feedback surveys are not popular in China.

The LEQ survey is divided into two parts. The first involves students' feedback in learning in the course (Tables 6 and 7); the second involves students' own reflections. For part 1, the mean of each question was

larger than 6.0 (with 7.0 as the maximum), indicating that students were very satisfied with the course. Among the 11 questions asked, Q1 and Q2 received the highest scores (Table 6). Referring to the Teaching Feedback Questionnaire (Table 7), the mean for each question (TQ1-TQ13) was very high (> 6). The three items with the highest scores were responsiveness, enthusiasm for teaching, and helpfulness.

Indeed, students were exposed to a wide variety of active learning strategies (e.g., one- and three-minute papers, think-pair-share, teamwork, brainstorming), technologies (online discussion board [BB], Twitter, Skype, echo360, Turnitin), and assessment techniques (e.g., formative and summative, peer and self), and the teaching team made a point of practicing what they preached in class and outside the class: "I think the interactions in SG8001M were most beneficial.

Table 6
LEQ Part I Results: Feedback on My Learning in the Course

	Survey Item	*M*	*SD*
Q1	The intended learning outcomes (ILOs) of this course were clearly explained to me.	6.46	0.84
Q2	The teaching and learning activities (TLAs) have helped me to achieve the ILOs.	6.31	0.93
Q3	The readings, notes, problem sets and other learning resources were adequate for learning the subject matter.	6.22	0.85
Q4	The assessment tasks (ATs) allowed me to demonstrate my learning in this course.	6.20	1.00
Q5	The assessment criteria are clear to me.	6.25	1.08
Q6	With reference to the CityU nominal workload (i.e. a credit unit is earned by approximately 40 to 50 hours of student work), the workload for this course is:	4.90	1.21
Q7	The spread of assignments throughout the duration of the course (13 weeks) is appropriate.	5.93	1.19
Q8	I have gained a good knowledge of the subject matter.	6.05	1.32
Q9	I have learned how to apply the knowledge, concepts and theories I learned in this course.	6.05	1.02
Q10	I have become more self-directed to explore the subject further on my own.	6.05	1.04
Q11	Having considered your learning experience in this course, how would you rate the quality of this course? (0: Extremely Poor -> 7: Excellent)	5.97	1.00

Note. Scale: 0 (*strongly disagree*) to 7 (*strongly agree*). Response rate = 57.84%, *n* = 59.

Table 7
Teaching Feedback Questionnaire Results

	Survey Item	*M*	*SD*
TQ1	This instructor prepared an excellent set of reading materials.	6.6	0.5
TQ 2	This instructor added to the discussion sessions and helped raise and answer questions.	6.6	0.72
TQ 3	This instructor organised class time effectively.	6.5	0.78
TQ 4	This instructor stimulated my interest in the subject.	6.6	0.62
TQ 5	This instructor's speech/language was easy to understand.	6.77	0.5
TQ 6	This instructor was responsive to student problems.	6.43	0.82
TQ 7	This instructor was approachable and helpful.	6.6	0.67
TQ 8	This instructor was enthusiastic about teaching.	6.93	0.25
TQ 9	This instructor encouraged me to ask questions.	6.7	0.6
TQ 10	This instructor encouraged me to think critically.	6.57	0.73
TQ 11	This instructor encouraged me to develop my own ideas.	6.33	1.01
TQ 12	This instructor aroused my interest to learn on my own.	6.24	1.02
TQ 13	Having considered aspects specified above, how would you rate the teaching overall?	6.43	0.75

Note. Scale: 0 (*strongly disagree*) to 7 (*strongly agree*). Response rate = 71.43%, *n* = 42.

Interaction improves my interest and enthusiasm in the class" (SG8001M student); "The teaching team prepared a lot of materials for this course. Moreover, there are different teachers with different teaching styles, which can set good examples for us." (SG8001 student); and,

> In our course, I paid special attention to how teachers employ OBTL concepts to manage their teaching activities. I found that ILOs for every single session are presented to the class, [and] suitable teaching and learning activities are conducted during each session to deepen understanding. (SG8001 student)

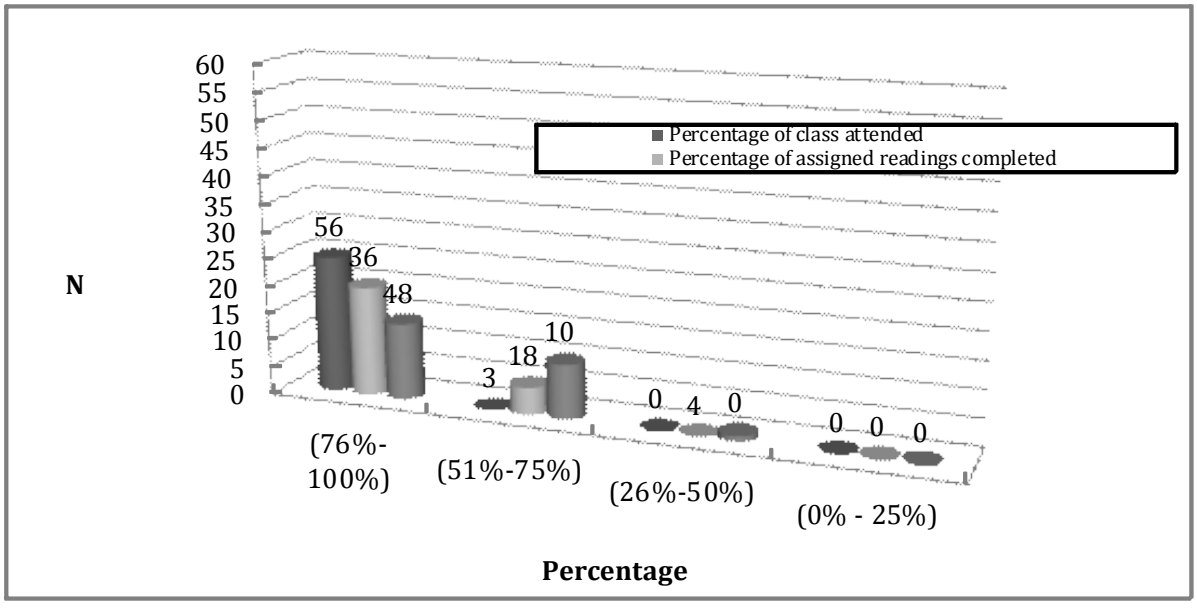
> During this class, I really learned a lot of concrete techniques and skills that will definitely benefit my TA tasks this semester. A point that I have applied in my TA classes is from the part of "delivery of teaching session": I have paid special attention on clarifying the marking criteria standard. (SG8001M student)

Qualitative comments suggest that students felt that the instructional methods facilitated the achievement of the intended learning outcomes, and that the course was very useful: "This course clarified the philosophy and tactics of teaching students systematically and stimulates me to form my own teaching philosophy" (SG8001M student); "Lectures were very effective and it directed to new ways of thinking to improve teaching performance" (SG8001M student); "Several teachers with different backgrounds teach this course. This is why I am very interested in it" (SG8001M student); and, "Different lectures in the class help to make students concentrate in the course" (SG8001M student).

More than 95 % of the students attended classes and completed at least 75% of the assigned readings (Figure 4). This can be confirmed by the student feedback: "This course enlightens me to think deeper about teaching, and encourages me to practice and enrich my teaching skills for my future teaching life" (SG8001 student); "I think the learning activities are the best aspect of this course, since it helped me to learn, not just listen" (SG8001 student); "The teachers have lots of sense of humor. The learning activities are properly allocated to students. The course materials are elaborately chosen and highly related" (SG8001 student); "All teachers prepared very well, they have passion, dedication and confidence towards their students. Students are highly motivated by them gradually" (SG8001 student); and,

> Teachers are very active and passionate in class; students are also very active participating in-group discussion and answering questions. I am very interested in various teaching and learning theories taught in class. What is more important is that it gives us an opportunity to use these theories via presentation and e-portfolio. (SG8001 student)

Figure 4
LEQ Part 2 Results: Students' Self Reflection



Note. $N = 59$, response rate = 57.84%.

The percentage of ILOs achieved was also relatively high; the majority of students achieved the ILOs set for the course.

Most of the students were active in the class activities (Figure 5). Engagement in class activities was driven by the instructors, engaging teaching and learning activities, and appropriate assessment tasks. Students commented: "The instructors are very enthusiastic and obviously they love what they teach. They managed to have our full attention with their dynamic and energetic way of teaching" (SG8001 student); and "The content of this course is helpful to learn theory and practice about education. What's more, the assessment procedures are very clear for us" (SG8001 student).

The way instructors delivered content was particularly highlighted in students' comments: "Definitely excellent teaching!" (SG8001 student); "I enjoyed classes very much. I am totally involved in the lectures" (SG8001 student); and, "The instructors taught very well and clearly. Their lectures were concise and well prepared. I have learned a lot and I am extremely amazed by their knowledge and level of understanding of this material" (SG8001 student).

The large majority of students were positively interested in this course, as shown in Figure 6. Students commented: "After attending this course, I have a clear understanding of OBTL. The course materials and teaching methodology used are totally adequate for me" (SG8001 student); and, "The teachers are very nice and they do have abundant experiences on teaching students" (SG8001 student).

Students' ratings suggest that they felt the course was particularly useful and well designed, and boosted their confidence level and self-efficacy (achievement of ILOs). The structured blended approach adopted for

Figure 5
LEQ Part 2 Results: Participation in Class Activities

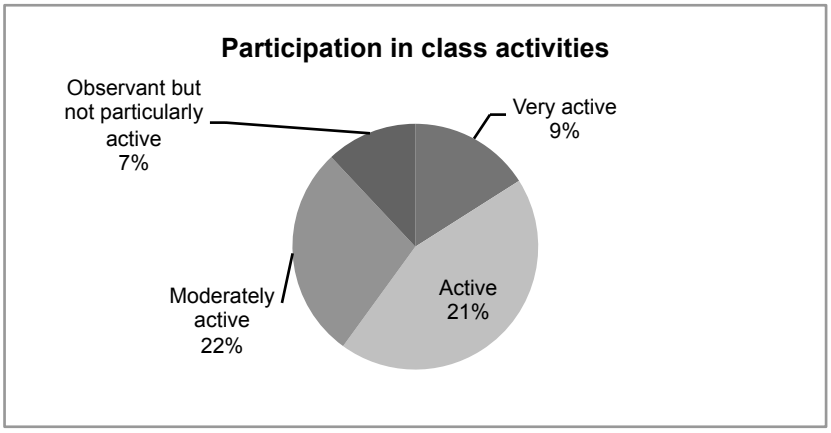
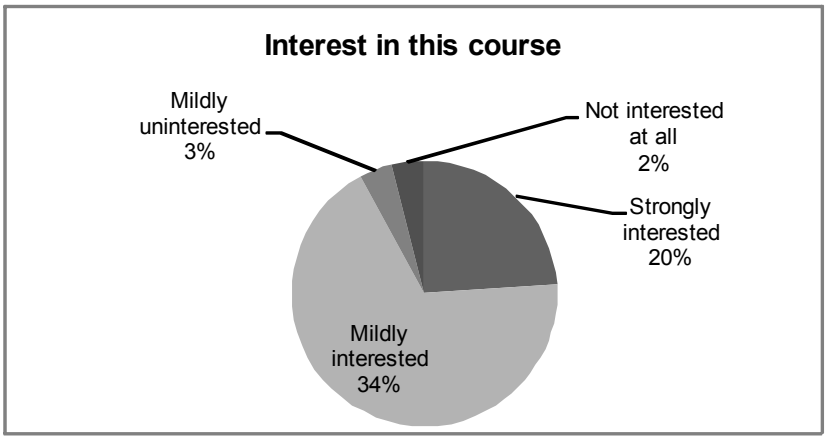


Figure 6
LEQ Part 2 Results: Interest in the Course



this course was well received, and the way the teaching team designed the class activities and the assessment parts was strongly appreciated. Students also felt that the content (e.g., teaching materials, self-study materials posted on Blackboard, topics posted in the discussion board, hand-outs) was carefully selected, appropriate, challenging enough, and valuable.

Finally, the course was also very beneficial for the staff involved in teaching it. The flexibility and agility adopted (Tables 6 and 7) allowed TAs to be creative, to really feel part of a team and improve students' experience:

> As a Teaching Assistant, I work closely with the course examiner and he has delegated the authority to design and improve the online learning activities and assessment tasks. I have a closer relationship with the students, which allows me to identify their genuine needs. For example, as a technologist, I can plan, design and implement peer assessment modules in the Learning Management System for the course with support from the course examiner. This allows our students, especially the part time postgraduates, to obtain instant and timely feedback that is useful to improve their learning. One representative feedback I received from a student is, "Well seems like (the TA) thought ahead of us," when expressing his views on the communication channel between student peers. (K. P. Mark)

The continuous brainstorming process in XT^2 is one of the steps that play a significant role in improving the quality of our teaching—creativity in particular. Even though a similar course is repeated over and over again each semester, we constantly brainstorm to ensure variety in the aspects of how the same content could be delivered differently and more efficiently. It unquestionably keeps the teaching team motivated. Students benefit from the brainstorming process as well because they are involved in many phases of the content and assessment (negotiation). The method of delivery and content is revised based mainly upon our students' feedback.

In order to streamline the teaching process, we endeavored to release the feedback to students within a short period of time, say within 24 to 48 hours (Malone & Lepper, 1987). I do think this is quite challenging when we were dealing with more than 40 students at a time (we usually get around 60 per seminar). For instance, the first time we taught, we asked students to define and criticize OBTL in class; we found that it was quite difficult to give individual feedback without the use of technology. As a result, we decided to post the content online and have students share their views. We gave speedy feedback online, and the motivational level of students was boosted. Mutual communication was also ensured.

> Besides, timeboxing is one of the important processes. Each member of the teaching team facilitates every individual part of the course, and each of us could modify the content anytime upon justifications and mutual agreements. This process is important because it creates a supporting and flexible environment (delegation, share of leadership). The highly collaborative nature of the team enhances our sense of belonging, satisfaction, collegiality and success. Synergic outcomes were resulted. (Dimple Thadani)

Discussion and Conclusion

The proposed pedagogical XT^2 model borrows the existing rapid feedback method from the domain of computer science (i.e., XP and agile methodologies), integrates it with a traditional teaching and learning model (i.e., microteaching), and emerges as an improved version of GTA training course. The framework highlights a mechanism for GTAs to receive timely feedback from both formative and summative assessment by instructors and peers. It provides a chance for GTAs to digest and apply feedback in the course in a very short period of time; comments received in cycle 1, applied in cycle 2 presentations as an integrated feed forward strategy, resulted in a long-term effect on GTAs. This fast feedforward of comments is an effective way for GTAs to improve and enhance their teaching ability as Sadler (1989) indicates: "The only way to tell if learning results from feedback is for students to make some kind of response to complete the feedback loop."

The XT^2 model has clearly addressed the shortcomings of traditional microteaching models mentioned by scholars (Coldevin, 1988; Thakrar et al., 2009) in terms of course flexibility and reflection on practice. The two cycles of presentation are also used as a direct comparison of the progress of learning in the course, where cycle 1 is used as the baseline model, to evaluate the effectiveness and impact of the course to the GTAs once they completed the second cycle.

We are, however, aware of the limitations of XT^2 in terms of manpower (checkpoints), willingness to be in the classroom at the same time and observe fellow instructors, the length of the induction process, fear of being observed and judged, the need to master every part of the course, continuous improvements (timeboxing), etc. We designed and only successfully tested XT^2 in a course in learning and teaching for new GTAs, with an average of 60 to 70 students per class over two semesters. Disappointed by similar courses offered elsewhere (i.e., too much focus on theory and

not enough practice), our original and main purpose was to develop an innovative, solid, engaging and effective course for non-local, Mainland Chinese teaching assistants to prepare them in the shortest period of time to facilitate classes and tutorials in Hong Kong. Results are very encouraging, and we do believe that the XT² framework is applicable to other courses and can easily be adopted.

To overcome these limitations some practical insights are to be followed. First, the duration of GTA training course is generally short. Success of achieving the course learning outcomes heavily relies on commitment and engagement of students and teachers. Lack of motivation to teach, and hence disengagement in the GTA training course, becomes the critical issue to be addressed at the beginning of the course. Course instructors should carefully observe students' classroom interactions and prepare real-life problems that students find practical when they teach (e.g., how to design a set of course learning outcomes that are student-centered). At the same time, online activities should be closely moderated and monitored so that teachers can rapidly provide feedback, which then boost online participation. Contemporary GTAs are facing lots of challenges in conducting their teaching duties; they have to respond to the rapidly changing teaching environment. A traditional microtraining model does not keep up with the current situation. We believe that the proposed XT² framework, which is built upon agile methodologies, is a superior pedagogical model for all the professional development and pre-teaching programs.

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