Mobile-Assisted Seamless Learning Activities

in Higher Distance Education

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Abstract

Among online learning factors stated in the research literature, it is argued that online activities is the strongest factor which contributes to online learning. This article illuminates mobile-assisted seamless learning activities by using laptops, tablets, or smart phones. Two conditions are compared, a) face-to-face (F2F) online webinars (web-based seminars or conferencing), b) the elements of part a, but complemented by teacher-recorded flipped classroom-videos (pre-lectures) before the F2F online webinars. Data collection consists of observations of 22 recorded F2F online webinars among 40 vocational student teachers divided into groups of 18 and 22 participants, and 12 interviews (six from each group, including both women and men). The study is theoretically within the research concept of mobile-assisted seamless learning: mediated learning anytime, anywhere, and in different contexts. The results raise some challenges and implications presented by using mobile digital devices to expand participation and motivation across different contexts for creation of ubiquitous knowledge access.

Keywords: Computer-Supported Collaborative Learning, Distance Education, Flipped Classroom, Mobile assisted learning, Seamless learning activities

1. Introduction

New media forms are being integrated into everyday life with increased levels of mobility—in more digitalised schools, higher education, and greater society. This is made possible by enhanced computer technologies, faster internet transmission, and different devices (e.g. Lee & Salman, 2012; Marin, et al., 2016). This media development has also expanded spaces and opportunities for mobile teaching and learning, observation and documentation, and participation and creativeness. The challenges teachers are facing with new media forms and with integrating media lie in how to organise and integrate with different synchronous and asynchronous learning activities, as well as examinations of course assignments (e.g. De Wever, et al., 2009; Buxton et al., 2012). The difference between these approaches is that *synchronous* learning activities are momentary, because they are direct and oral. What is unique is that students can participate in a wireless and mobile manner in real time, and discuss, collaborate, negotiate, and receive oral examination online. *Asynchronous* learning activities are delayed, and usually written; these include using the course documents, giving and receiving written peer feedback, and self-assessment and critical evaluation of different texts, as well as accessing recorded lectures and flipped classroom videos online. Unique here is that the written documents, texts, and recordings are published afterwards in the online learning management system (LMS). This content reveals the extent of participation and motivation, the students' posts and presentations, and the teachers' arrangement of the course (Amhag, 2013; Amhag & Jakobsson, 2009).

1.1 The Focus and Concepts of the Study

This article focus on comparing two conditions in higher distance education: a) face-to-face (F2F) online webinars (web-based seminars or video conferencing), b) the elements of part a, but complemented by teacher-recorded flipped classroom videos (pre-lectures) before the F2F online webinars by using mobile technologies such as laptops, tablets, and smartphones. Such technologies are accessible from different locations at anytime, anywhere. The key discussion focuses on the role of creating seamless mediated learning activities both in and out of online webinars F2F, or with and without teacher-recorded flipped classroom videos.

Kuh (1996) describes how the *seamless* concept has changed from reflecting separate and distinct parts—e.g. in-class and out-of-class, at school and during free time, academic at school and non-academic at practice, curricula of the course and co-curricular activities, or on- and off-campus experiences—to being one part that is bound together. The concept of mobile-assisted seamless learning (MSL), according to Wong and Looi (2011), includes students' mediated meaning and learning anytime and anywhere, and the possibility of switching the learning context and going from formal to informal learning, from personal to social, or from consuming to producing. To bridge the profound gap between formal and informal learning, with reference to Chan et al. (2006), is to extend formal learning time into informal learning time, embracing opportunities for out-of-school learning, as driven by the students' personal interests. An example of this is flipped teaching with MSL by integrating the features of mobile and wireless communication technologies (Hwang, Lai & Wang, 2015). The result provides a guide for researchers and educators to develop effective flipped learning activities as well as plans for helping students learn seamlessly across contexts.

Lage et al. (2000) gives the simplest definition of a *flipped,* or *inverted, classroom*: 'Inverting the classroom means that events that have traditionally taken place inside the classroom now take place outside the classroom and vice versa' (p. 32). The core idea of flipped classrooms is to invert the common instructional approach, such as homework before a lesson instead of after, by using teacher-recorded videos with various briefings and interactive instructions. These videos are accessible from different locations via digital devices, prior to the class' learning activities. This model consists of two parts: 1) individual instructions outside the classroom and 2) interactive collaborative learning activities F2F inside the mobile online webinars. This second part takes away the videos and instructions out-of-class to allow better use of in-class time during the F2F online webinars with discussions, tutoring, and scaffolding of students' learning activities (e.g. Bishop & Verleger, 2013; Long et al., 2014).

'Class' becomes the room/place of the mobile *online webinars* integrating F2F conferencing with a predefined aim of using real-time experiences accompanied by a teacher's guidance. Mobile F2F online webinars offer potential for everyone to see and hear one another through oral discussions, while at the same time communicating via text-based chat and notes. This concept directly assists learners F2F in problem solving, discussing theoretical concepts, reviewing literature, engaging in collaborative group work, and in evaluations. Furthermore, the synchronous online webinars can be recorded for later asynchronous viewing online within the LMS to provide students with a chance to take a step back, reflect, self-assess, and compare various contributions.

2. Previous Research of Mobile Learning

Mobile technologies are a new research addition to higher distance education as is their integration, what benefits are being observed, what challenges are being faced, and how these issues are being addressed. Pegrum, Oakley and Faulkner (2013) use the terms as *electronic learning* (e-learning), *mobile learning* (m-learning), and *ubiquitous learning* (u-learning) in relation to the term *seamless learning*. *E-learning* is learning through digital technology, *m-learning* is through portable means such as handheld laptops, tablets, or smartphones, and *u-learning* addresses possibilities for mobile techniques providing support irrespective of place and time. They emphasise that mobile devices can support a variety of teaching methods, but it is important to plan *how* to use them; for example the ability to use mobile devices in different contexts such as classrooms, field trips, or wherever a learning situation can take place, to create opportunities for seamless learning. Unfortunately, these terms are often associated with a simplistic understanding of facilitating learning by delivering *instructional content* (Chan et al., 2006). A case study by Marin et al. (2016) using tablet devices shows they were conceived as mediators and cognitive tools that enhanced the creation of ubiquitous and seamless learning spaces from the teachers' point of view; the students' perspective is not included. Furthermore, a case study by Lan and Lin (2016) shows notable improvements in two groups of Chinese language learners' test-based communication performance. The real-world group in the study made significantly fewer errors and had more peer cooperation through the support provided in their LMS compared with the classroom group. Wong and Looi (2011) suggest four more holistic seamless learning experiences and use of multiple technological devices, such as those with different screen sizes, large shared displays, and large multi-touch screens. A later study by Wong (2013) shows that when students used smartphones to take photos in real-life contexts, and then posted them onto a wiki space for peer review, learner-generated context (LGC) is crystallised in seamless learning processes with the interplay of physical settings and the mediation of mobile technology. Moreover, Wong et al. (2015) shows new learning practices among students who negotiate in-school and out-of-school learning spaces, to bridge formal and informal aspects of language learning. The findings indicate that student participation significantly improved, but teachers must plan and stimulate online interactions, as well as create artefacts, such as teacher-recorded flipped classroom videos, instructions and examples of language learning.

2.1 Previous Research of Flipped Classroom

Research on the emerging pedagogy of teacher-recorded flipped classroom videos in higher education is increasing. Some researchers are arguing for a new way of mobile teaching and learning. Fulton (2012) can recommend seven benefits of teacher-recorded flipped classroom-videos: (1) students can work at their own speed, (2) homework before scheduled lectures provides teachers with better insight into students' reading and writing abilities, as well different learning styles, (3) teachers can more easily assume the learning outcomes and give feedback, (4) teaching time is used more efficiently and creatively, (5) the students' interest and involvement increases, contributing to better learning outcomes and development, (6) learning theories support new methods, and (7) the use of handheld technologies provide increased flexibility. The result of Herreid and Schillers (2013) study among 200 teachers showed that teacher-recorded flipped classroom-videos brings more: a) discussions with and between students about the authentic problems, b) research-based work, c) those who miss teaching occasions can take part of in recorded flipped classroom videos and webinars retrospectively, d) the method promotes the design of in- class time and out-of-class time; e) students are more active and take more responsibility for their learning, and f) the students appreciate the working methods. Bishop and Verleger (2013) show a comprehensive survey of flipped classrooms in different student groups and they are overall generally positive towards the experiences. A literature review by Roehl et al. (2013) indicates that recorded flipped classroom videos are easy to use with mobile accessible technologies to provide prepared pre-class activities for planned in-class time. More opportunities can be provided to students during in-class time illustrates Long et al. (2014), as well can the teachers prepare for their courses by implementing both a pre-class and in-class phase. Even faculty contact time may be reduced as a result of using recorded flipped classroom (Baepler et al., 2014). Furthermore, demonstrates Wagner et al. (2013) that the recorded flipped classroom materials can offer a unique, yet challenging, opportunity for universities to collaborate on maximising the effectiveness of higher education. However, referring to Wallace (2014) must video, text, and instructions be balanced both synchronously and asynchronously in accordance with need and practicality.

2.2 Previous Research of Online Webinars

The impact of online synchronous webinars F2F versus classroom instruction in Nelson (2010) shows no significance difference among 224 nursing students between the two modes groups; the online synchronous webinar was found to be just as effective as classroom instruction. Rich (2011) measures the impact of online synchronous webinar instruction versus classroom instruction which demonstrate collaborative factors but a lack of additional evidence on actual participation outcomes. Moreover, demonstrate Buxton et al. (2012) among research pharmacists' satisfaction with, and reasons for, enrolling in a series of continuing education online webinars that include presentations, lectures, workshops, and online discussions. However, all these studies above focus on organising and administrating mobile education from an individual perspective, and how new media techniques can make education either more effective or detrimental. Therefore, it is important to research how mobile teaching and learning in a more digitised form of higher distance education are enhancing students' online learning. Empirical evidence is needed on the significance of how two conditions of seamless mediated learning activities can contribute to the broadening of online learning: pedagogy and didactics.

3. Theoretical Approach

Theoretically, the present study is within the research concept of mobile-assisted seamless learning. This refers to the unbroken integration of learning experiences across various dimensions, including the notion that students can learn anywhere and at any time, they are curious, and they can easily switch learning contexts to another, or a variety, of scenarios. For instance, this could be from formal to informal or from personal to social (Chan, et al., 2006; Wong, 2013; Wong & Looi, 2011). A key component of this idea is that each student is using a personal device as a mediator. Methodologically, the study is based on the concept of MSL by Wong and Loois (2011), who designate six dimensions in their descriptions and designs of actual learning: 1) formal and informal learning, 2) personal and social learning, 3) learning across time, 4) learning across locations, 5) ubiquitous knowledge access, and 6) physical and digital spaces. In the present study these principles are shown in sharing of knowledge in F2F online webinars, as well as critical review of recorded webinars and teacher-recorded flipped classroom videos for enhancing students' online participation and learning.

4. Aim and Methods

The present study aimed to compare two conditions in higher distance education with seamless mediated learning activities via laptops, tablets, and smartphones, and what significance these factors have for students' online learning in a more digitalised form of higher distance education. The following questions were addressed:

- What is the importance of application of digital devices for students' online learning by using mobile F2F webinars and teacher-recorded flipped classroom videos?
- What views do students' in using MSL activities in higher distance education?

Data collection consisted of recorded mobile F2F online webinars (N=22) among two groups of vocational student teachers (N=40) during the same first three courses in the Vocational Teacher Education Program (VTEP). Group 1 included 18 students and their studies during the Spring 2012, Autumn 2012, and Spring 2013 terms. Group 2 included 22 students and their half-time studies half a year later than Group 1 during the Autumn 2012, Spring 2013, and Autumn 2013 terms. The two conditions in higher distance education with seamless mediated learning activities between the groups had a distinguishing factor. Group 1 participated in 12 online webinars, while Group 2 had 13 online webinars, complemented by five teacher-recorded flipped classroom videos made available 1 week before the follow-up webinar in their LMS. Comparison is also based on interviews with 12 students (six from each group, including both men and women) about their views of the MSL activities. Before the research interviews, all 40 students were asked via email whether they wanted to contribute their views. The 12 students who consented to participate in the study signed an agreement of the study.

The vocational student teachers were studying to become authorised vocational teachers for any of the 12 upper secondary school vocational programs in Sweden. Approximately two-thirds of the teachers were already working as informal vocational teachers. All had been working for several years in their occupations, and only a few had previously studied in university. VTEP in Sweden requires students to earn 90 credits; including six courses totalling 60 credits in educational sciences along with 30 credits in teacher training at a partner school or within the students' own teaching position as informal teachers. All course content in the VTEP has strong links between vocational training and education. Admission requires qualified and relevant professional, validated skills. As professionals, they placed priority on their work; therefore their academic studies presented fluctuating and new and different demands.

4.1 Implementation

Two conditions in higher distance education were compared in these two student groups during the same first three courses of half-time study in the VTEP. All three courses started with presentations of course assignments and different lectures at the university lasting 2 days and ended with 1 day of examinations also at the university. The student teachers also received an introduction and guidelines for the e-meeting system via Adobe Connect, a SUNET E-Meeting system, and received an online overview of the required equipment (webcam, microphone/headset, and text-based chat). During the same three online courses, students worked both individually and in five groups of four or five students, using problem-based course assignments with deadlines. Online webinars were scheduled in cooperation with the students at the start of the course, with a defined date and time for each group. During the online webinars F2F, the students received follow-up on the course starting part, and they discussed theoretical concepts from the course literature and experiences between teaching practices and professions, as well as tutoring and scaffolding in different course assignments. A majority of the webinars were recorded and made available in the students' LMS to provide the opportunity to take a step back, reflect, self-assess, and compare various contributions. After 1 year of studies the study was complemented by a course evaluation in both groups about the students' views on how the MSL activities contributed to their learning (see Table 3).

Group 1, summarised in Table 1, had 12 online webinars F2F. Some of the webinars were made available for students to attend as per their own needs and preferences through flexible drop-in available at anytime, anywhere. All webinars thus varied in length from 20 to 54 minutes.

Table 1. Summary of the design in Group 1 using mobile F2F online webinars during three courses in the Vocational Teacher Education Program (VTEP)

Group 1		**15 students,** half-time study
Date	**Length**	**Course 1 VTEP** - Learning outcome about social relations, conflict management and educational leadership. Three group wise online webinars as a follow-up of course start and tutoring of course assignments.
08/02/2012	00:31:06	Webinar: Follow-up of course start and tutoring in technology and course assignments of social relations, one group.
08/02/2012	00:52:01	Webinar: Follow-up of course start and tutoring in technology and course assignments of social relations, one group.
07/05/2012	00:30:59	Webinar: Tutoring in educational leadership, three groups, drop-in
Date	**Length**	**Course 2 VTEP - Learning outcome about syllabus, vocational didactics and assessment**
07/11/2012	02:14:27	Webinar: Literature of language-oriented teaching, three groups, 44 min / group
14/11/2012	00:35:41	Webinar: Literature of professional didactics, one group
15/11/2012	00:40:30	Webinar: Literature of professional didactics, one group
21/11/2012	02:12:23	Webinar: Theory of Assessment & Grading, three groups, 25 min / group
29/11/2012	00:54:23	Webinar: Theory of Formative assessment, three groups, drop-in
04/12/2012	00:39:09	Webinar: Theory of Summative assessment, three groups, drop-in
Date	**Length**	**Course 3 VTEP - Learning outcome about development, learning and special education**
23/01/2013	00:23:47	Webinar: Literature of Read & writing disabilities, one group
23/01/2013	00:20:44	Webinar: Literature of Read & writing disabilities, one group
25/01/2013	00:34:35	Webinar: Literature of Read & writing disabilities, one group

Group 2, summarised in Table 2, had 13 online webinars F2F, with five being examinations for a course assignment. Five of the webinars were complemented by teacher-recorded flipped classroom videos lasting 20–30 minutes. These were made available 1 week before the follow-up online webinar F2F and contained introductions of theories and concepts, along with reading instructions. Some of the online webinars were made available for students to attend as per their own needs and preferences through flexible drop-in available at anytime, anywhere. All webinars thus varied in length from 25 to 70 minutes.

Table 2. Summary of the design in group 2 using mobile online webinars F2F complemented with teacher-recorded flipped classroom-videos during three courses in the Vocational Teacher Education Program (VTEP).

Group 2		18 students, half-time study
Spring semester 2013 Not recorded		Course 1 VTEP - Learning outcome about social relations, conflict management and educational leadership. Three group wise online webinars as a follow-up of course start and tutoring of course assignments.
Date	Length	Course 2 VTEP - Learning outcome about syllabus, vocational didactics and assessment
02/15/2013	00:27:46	Flipped classroom: Theory of Pedagogy & Didactic, follow-up of course start
02/25/2013	01:16:27	Webinar: Teaching & Education, five groups, drop-in
03/15/2013	00:19:13	Flipped classroom: Theory of Formative assessment
03/21/2013	00:19:51	Flipped classroom: Theory of Assessment & Grading
03/21/2013	01:14:01	Webinar: Assessment & Grading, three groups, 25 min / group
03/25/2013	01:00:59	Webinar: Assessment & Grading, two groups, 30 min / group
05/07/2013	00:55:06	Webinar: Tutoring of the two last course assignments, five groups, drop-in
Date	Length	Course 3 VTEP - Learning outcome about development, learning and special education
09/09/2013	00:28:05	Flipped classroom: Theory of Read & writing disabilities, follow-up course start
10/14/2013	00:47:49	Webinar: Literature of Read & writing disabilities, five groups, drop-in
10/29/2013	01:04:57	Webinar: Examination of Read & writing disabilities, two groups, 32 min / group
10/31/2013	00:46:22	Webinar: Examination of Read & writing disabilities, one group
10/31/2013	00:42:36	Webinar: Examination of Read & writing disabilities, one group
10/31/2013	00:56:22	Webinar: Examination of Read & writing disabilities, one group
12/10/2013	00:34:24	Flipped classroom: Theory of Teaching & Education of vocational students
12/19/2013	00:39:50	Webinar: Tutoring of the last course assignments, five groups, drop-in

5. Findings and Analysis

In the findings from observing recorded online webinars F2F (N=22) among 40 student teachers (18 in Group 1, 22 in Group 2) and 12 transcribed interviews are six selected excerpts (three from each group) that serve as examples of the analysis. This was performed by using Wong and Loois' (2011) six dimensions of MSL activities: 1) formal and informal learning, 2) personal and social learning, 3) across time, 4) across locations, 5) ubiquitous knowledge access, and 6) physical and digital spaces. These patterns are used in summarising the results of the study.

5.1 Group 1

The first three excerpts addresses student teachers in Group 1 and their experiences and views of mobile F2F online webinars during the first three courses in the VTEP (see Table 1).

Student 1a, in the Hotel and Tourism program, specialisation conference, described her experiences with F2F online webinars:

> It took too much time to get the webinars up and running during the first course, and they all had different questions, and a lot of task-switching. This sometimes created confusion. Support before them was also lacking. In terms of literature we would, for example, read two books and highlight something interesting, and then formulate a question. I had no idea how to create those questions.

> Therefore, I wish there were some kind of preparation before the webinars, perhaps a mini lecture, to hear what others says. I could learn from that. It would also be useful to be able to get the page numbers of important parts in the literature; there were few examples of interesting content and which issues should be discussed further.

This student raised the issue that the MSL requires sufficient structure and support for students in academic reading, and there is a need to critically question the literature. Mobile devices—in this study personal laptops, tablets, or smartphones—could function as a 'learning hub' for experiencing seamless learning (Looi et al., 2009). The devices can bridge physical and digital spaces (Wong & Looi, 2011) to support students who are less academically inclined, especially in their academic reading and writing. In seamless learning environments according to Kuh (1996), students should be encouraged to take advantage of learning resources that exist both inside and outside of the classroom, as well as to use their life experiences to make meaning of material introduced at the start of the education. The importance of linking students' in-class and out-of-class experiences at a distance, with reference to Wong and Loii (2011) and Wong (2013), is to create academic achievement with seamless learning through formal and informal learning, across time and location, as well as with more ubiquitous knowledge access in the form of flipped preparations before the webinars.

Student 1b, in the Business and Administration program, referred to the digital ability among teachers and students:

> Most webinars were very technology-centred. I constantly heard: 'do you see me?', 'can you hear me?', 'now it's gone' [laughing]. The systems depends on the habits of both teachers and students, and requires us to be able to listen and be prepared to discuss. Everyone must take responsibility. Otherwise, it will be messy and slow.

Some initial problems this student raised were also confirmed in the observations and occurred at the start of the use of mobile F2F online webinars. The technology of the e-meeting system was unreliable because of a problematic mobile connection. Some students were logging in and out, which led to the repetitious, 'do you see me?' and 'can you hear me?' Accessing the voice audio and web camera requires a stable mobile connection. Moreover, the teachers were initially unfamiliar with the online technique and how to support the students. Mediating by technology for seamless learners should offer the potential to be able to explore, identify, and seize infinite latent opportunities in collaboration with other students and in a structured way (Chan et al., 2006; Wong & Loii, 2011). This should be present rather some of what appeared in the observations during the F2F webinars, such as being inhibited by logging in and out, constantly shifting content, unnecessary repetition of formalities (e.g. number of pages, font size), or unclear supervision enabling more independent reading of the study guide and literature.

Student 1c, in the Health Care program, emphasised being able to learn anywhere at any time and easily switch learning contexts using a tablet.

> I think it has been great not to have to go to the physical university; many students live far away. This is a new way for me to meet everyone [by tablet] without being at the university. However, there were some teething problems in the malfunctioning. Sitting with two devices [laptop and tablet] and not being able to access the e-meeting system made me stressed. On top of that, I had telephone contact with a classmate who also couldn't connect. It was frustrating to be prepared and not be able to get in. Otherwise, it was great!

In this excerpt, the student stressed that, beyond the technical teething problems, the importance of using modern pedagogy and instruction in a more digitalised type of higher distance education. The notion of seamless learning research, 'learning anytime, anywhere,' and not 'learning everytime, everywhere' (Wong et al., 2015; Wong & Looi, 2011) includes that students do the course assignments and pursue their learning outside of the physical university. The goal is to empower and support students to learn wherever and whenever they are stimulated to learn, in different contexts. These spaces consist of scenarios in which students are active, productive, creative, and collaborative across different devices and settings (Chan et al., 2006). Learning changes their approach to learning and development in and between moments of teaching practices and as professionals, e.g. as hairdresser, seller, chef, or vocational teacher.

5.2 Group 2

The following three excerpts address student teachers in Group 2 and their experiences and views of mobile F2F online webinars prepared with teacher-recorded flipped classroom videos during the first three courses in the VTEP (see Table 2).

Student 2a, a student teacher in the Hairdressing program and also working at a personally owned salon, was close to dropping out of the educational program if the support online had not existed:

> Without webinars, I don't think I would have continued my studies. In particular, all the documents [papers and reports] posted to the LMS and preparations [flipped classroom] before the follow-up webinars provided a sense of reality. I wish there were more lectures or other types of tutoring and

> scaffolding. I also think it was convenient to be able to participate somewhat quickly and easily at work and I was able to take a short time to look through webinars afterwards. I think it was good and I would have liked additional offerings!

The student's statements reflected the importance of social arrangements for meaningful learning at a distance. The support via online documents online and preparation via teacher-recorded flipped classroom video, as pre-lectures prior to the follow-up webinars, developed a greater sense of reality. In the LMS, students could also download study guides, research articles, and reports from the National Agency for Education (Sweden). The student also emphasised 'cross-time and cross-location' and socio-constructivist learning of 'formal learning in informal settings' (Wong et al., 2015; Wong & Looi, 2011). A potential pitfall can also be seen in these activities. When students were provided with the opportunity to interact within their LMS, but were not given support for deepening their understanding through textual knowledge, this could have been a cause for dropout. An online webinar involves the full, unique individual in a dynamic interplay of participation and reification of learning (Buxton et al., 2012). This is possible when students directly meet fellow students and teachers online F2F, and discuss how they should deal with the theoretical concepts from the course literature, course assignments, and experiences between teaching practices and as a working professional.

Student 2b, a student teacher in the Hotel and Tourism program who was working half-time as a flight attendant, commented:

> The webinars and flipped classroom were very beneficial! For me this is somewhat special because I work as a flight attendant, but there is also benefit for students who may want to be able to close time gaps. Even the chat communications worked very well in the groups. It was fun to have peer feedback, and we also had some time to respond to the course assignments. I enjoyed it and the peer feedback was a great support!

This student highlighted the teacher-recorded flipped classroom videos, posted 1 week before the follow-up online webinars, which were also recorded and accessible afterwards in the LMS. These recordings gave good leeway for the student to later take part in clarification and discussions related to the content. Even the peer learning activities for providing peer feedback on classmates' course assignments and their corresponding work in the group's discussion forums in the LMS within 1 week were appreciated (e.g. Amhag, 2013; Amhag & Jakobsson, 2009). The students had opportunities to contribute actively to the course documents and literature, flipped recordings, mobile F2F online webinars, and text-based chat communications. They could also give and receive peer feedback in the LMS discussion forums. In this way, students could also practice and value their understanding of academic reading and writing, and creatively formulating their critical reviews of others. The design extended the space of the learning flow in the LMS with the combination of textual documents, preparation, and recordings of F2F online webinars for learning alliances (Wong et al., 2015; Wong & Looi, 2011). The ubiquitous knowledge access bridged gaps between formal and informal learning, extending time for the former into the latter, and embracing the opportunities of out-of-school learning driven by the students' personal interests (Chan et al., 2006).

Student 22c, a student teacher in the Handicraft program and specialising in makeup and skin therapy, was generally positive:

> I thought it worked well. Everyone could see and hear each other and ask questions. It was also easier to participate because we did not need to be physically at the university. I definitely wish more teachers could work in this way. Now is also the time for using mobile, online lectures and presentations at distance. We, as teachers, also want that with our own students and give them the possibility to show their presentations from home. In this way, they don't miss anything if they are not at school for whatever reason.

This student emphasised the mobile online examination F2F and the importance of using modern technology in a seamless and mobile manner, in a more digitalised form, and at a farther distance, for higher education and teaching. It is now easier to participate and collaborate from home or at work at a distance. The student wished more teachers would proceed to switch learning contexts between personal and social, as well as have in-school and out-of-school learning spaces by using mobile online webinars F2F and flipped video recordings with personal devices as a mediator (Chan, et al., 2006; Looi et al., 2009; Wong & Looi, 2011). It is important that learning online involve the interplay between local contexts; in this study these were the preparation and presentations from home or work before and during the examinations. This is a sort of global context online when students can see and hear each other's arguments F2F during the online webinars and recordings, from different contexts. These mobile-assisted

mediated activities extend one-off learning to ongoing learning and trigger a shift from consuming to producing (Wong et al., 2015; Wong & Looi, 2011).

5.3 Two Course Evaluations

The two course evaluations, summarised in Table 3 below, regarding the students' views on how the seamless learning activities contributed to their learning (Group 1: 9 answers from 18 students, 50 %; Group 2: 15 answers from 22 students, 68 %), was given after 1 year of studies (in January 2013 for Group 1, in June 2013 for Group 2). The most prominent result in the comparison in both groups shows that the majority of the students strongly agree that F2F online webinars (75 % and 73 %) contributed to their learning online. This was despite Group 1 having technical problems with the e-meeting system owing to a problematic mobile connection and teachers' unfamiliarity with the online technique online and how to support the students. However, the majority of the students in Group 2 noted the teacher-recorded flipped classroom videos (87 %) and the majority of these students (80 %) had retrospectively reviewed and reflected on the meaning of the contents. The major differences between the two groups' results appear especially with regard to the groups' collaborative learning with peer feedback and with making creative use of their critical review of others presentations and discussions; 90 % of the students in Group 2 strongly agreed about their activities in the group's learning, though only 33 % in Group 1 did. Perhaps this was due to the initial technical problems and the teachers' unfamiliarity with the system. The two groups' activities during the webinars (67 % and 80 %) by discussing different perspectives and their experiences of university lecturers at course start (78 % and 67 %) also show differences, albeit to a lesser degree.

Table 3. Two course evaluation results after 1 year of studies on students' views of how seamless mediated learning activities contributed to their learning

Seamless Mediated Learning Activities	Group 1 (50 %) 1-3 Disagree- Partly agree	Group 1 (50 %) 4-6 Agree – Strongly agree	Group 2 (68 %) 1-3 Disagree- Partly agree	Group 2 (68 %) 4-6 Agree – Strongly agree
University lectures at course start	22 %	78 %	33 %	67 %
Webinars online F2F	25 %	75 %	27 %	73 %
Flipped classroom	not included	not included	13 %	87 %
Repeated flipped	not included	not included	20 %	80 %
Active in webinars	33 %	67 %	20 %	80 %
Active in the group's learning	67 %	33 %	10 %	90 %

6. Discussions and Implications

The sample size of 40 student teachers: 18 in Group 1 and 22 in Group 2, is the weaknesses of the study, and therefore difficult to generalize the results. However, the result of the comparison between the two conditions in the VTEP at a distance during the same first three courses among these two groups raises some challenges and implications. The further key discussions will focus on the role of promoting MSL activities in relation to *m-learning* through wearable digital devices by using laptops, tablets, or smart phones, *e-learning* through digital mobile technology, and *u-learning* representing the possibility of omnipresent mobile capabilities that can support students' mobile-assisted mediated meaning and learning anytime and anywhere. This is to switch learning contexts to another or a variety of scenarios; such as from formal to informal, personal to social, or consuming to producing (Chan, et al., 2006; Looi et al., 2009; Pegrum, Oakley & Faulkner, 2013; Wong, 2013; Wong & Looi, 2011)..

6.1 Results of M-learning

In terms of *m-learning* shows through portable digital devices F2F (Pegrum, Oakley & Faulkner, 2013) that they were promoting students' participation and motivation to learn anytime and anywhere, because they could easily switch learning contexts to another or variety of scenarios, e.g. scheduled group discussions and literature reviews, follow-ups of course starts, drop-in discussions, and tutoring of course assignments (see Tables 1 and 2). One student noted that 'without webinars I do not think I would have continued to study.' Another pointed out the issue of solitude in one's studies and being 'on my own with a stack of books.' The online webinars F2F with different discussions, were moving between theory and practice, in addition to literature, assignments, and personal experiences. Students could explore, identify, and seize infinite latent opportunities when working in collaboration

with other students, as well as participating and joining in the dialogues. However, in Group 1, with no flipped recordings before the webinars, students were lacking the link between in-class and out-of-class experiences at a distance. In this way, they could not create academic achievement with seamless learning through formal and informal learning, across time and locations, or with more ubiquitous knowledge access, as was provided with flipped recordings before the online webinars F2F (Wong, 2013; Wong & Loii, 2011).

6.2 Results of E-learning

In terms of *e-learning* (Pegrum, Oakley & Faulkner, 2013), shows that the mobile technology posed challenges when the e-meeting system had a problematic mobile connection, students logged in and out, and teachers were unfamiliar with the online system and how to support the students. This result raises some challenges and implications in adopting mobile devices in higher distance education. Training for teachers in online pedagogy and didactics is needed. Mediating by mobile technology for seamless learning should offer potential for students to use different devices to participate in e-meetings in a structured way (Chan et al., 2006; Wong & Loii, 2011), instead of, observed in the recordings of the online webinars, being inhibited by logging in and out, constantly shifting content, unnecessary repetition of formalities, or unclear supervision. Scenarios of learning and development include learning individually or collectively, in small groups or large online community, in out-of-class spaces F2F at home or at the workplace, or in in-class spaces such as classrooms, on campus or outdoors, and with possible involvement of teachers, mentors, librarians, workplace professionals, and members of other supportive communities. Seamless learning space refers to the collection of various learning scenarios that expand formal learning to informal, as well personal to social in collaboration with other students (Chan et al., 2006; Long et al., 2014).

6.3 Results of U-learning

In terms of *u-learning* and the possibilities of ubiquitous or omnipresent mobile technology supporting students' mediated meaning and learning (Pegrum, Oakley & Faulkner, 2013), the result shows the importance of accessing knowledge within course documents, flipped recordings before the online webinars F2F, and the recordings of them when made available in the students' LMS. These provided students with the opportunity to take a step back, reflect, self-assess, and compare various contributions. The recordings expanded the range of educational features, learning activities, supervision, motivation, collaboration, and interdisciplinary engagement. Flipped recorded lectures, according to several studies, have become one of the most emphasised and innovative teaching strategies in recent years (Bishop & Verleger, 2013; Fulton, 2012; Herreid & Schiller, 2013; Hwang, Lai & Wang, 2015; Long et al., 2014). In this study, Group 2 highlighted primarily utilitarian aspects of the recordings. One student stressed: 'I think they were great because I could look at them when I needed them during the time I was working on course tasks'. Another student noted the effectiveness: 'I like the "flipped classroom" very much. This helped me to be prepared and I could use the lessons more effectively than when I was just sitting and listening at the university'. Switching the context of learning is central because of the opportunity to go from formal to informal learning, from personal to social, and from consuming to producing (Chan, et al., 2006; Looi et al., 2009; Wong, 2013; Wong & Looi, 2011). Furthermore, the essence of flipped recordings gives teachers greater opportunities to achieve competence in online learning and successful prepare course implementation, both in the pre-class and in-class phases with the students during the online webinars F2F (Baepler et al., 2014; Long et al., 2014), as well as for universities to collaborate on maximising the effectiveness of higher education (Wagner et al. 2013). These activities are working across different devices and settings, as in this study, with seamless mediated learning activities by using laptops, tablets, or smart phones in higher distance education. With further online research in ICTs these concepts will have the potential to become a design-based research model for MSL.

6.4 Conclusions

The conclusions of this study highlights that the students are increasing their participation and motivation to learn anytime and anywhere in different contexts to be a key part of online learning with mobile online webinars F2F and teacher-recorded flipped classroom videos as an excellent means for seamless mediated learning activities, MSL. The MSL-activities had also a positive influence for collaborative learning online, as well as expanded spaces and opportunities for oral and textual dialogic exchanges online. Furthermore, the MSL-activities online were also promoted the students' learning outcomes and their trust in ICTs. In summary, this study has showed the importance of MSL-activities online with:

- Tutoring and scaffolding by online webinars F2F, as well as teacher-recorded flipped classroom videos

- Peer learning processes with dialogic exchanges online in webinars F2F regarding theoretical concepts, literature review, individual experiences, problem solving, and course assignments

- Receiving and providing peer feedback, co- and self-assessment F2F
- Collaborating via text-based chat, common notes, documents, and recordings F2F
- Sharing screens, software, and whiteboards with others F2F
- Critical peer review during online presentations and examinations of course assignments F2F

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