

## **Exploring in-service preschool teachers' conceptions of and approaches to online education**

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This paper reports on an investigation of adult online learning for 91 Taiwanese in-service preschool teachers enrolled in online degree programs. By using an open-ended written essay to investigate what learners thought they were learning through online education (their conceptions) and how they engaged in online education (their approaches), qualitatively different categories of conceptions and approaches were identified through a phenomenographic analysis approach. The results found that their conceptions of online education ranged from “a way of diploma completion” to “a way of lifelong learning,” while their approaches ranged from “interacting with people” to “getting involved in the community of sharing.” In addition, the teacher-learners with fragmented conceptions (“a way of diploma completion”) tended to have surface approaches (“interacting with people”), and those with cohesive conceptions (“a way of lifelong learning”) tended to have deep approaches in online education (“getting involved in the community of sharing”).

### **Introduction**

Online education has been described as a subcategory of distance education, which has been defined as the delivery of instruction in which time and location separate students and teachers (Andrews & Tynan, 2012; Miltiadou & Savenye, 2003). Nowadays it has become very popular as people come to realise the many advantages of using online technology. Many learning institutions have made extensive use of electronic resources, with course materials provided on websites, and tutorial support provided by electronic online systems. When online education classes are recorded and archived, students can access the learning materials at any time and from anywhere. Online education has allowed learners who have employment and a family to develop their professional knowledge and competence by saving travel costs and allowing a flexible schedule (Park & Choi, 2009).

According to some research findings, a growing number of preschool professionals are using online training to improve their skills and knowledge (Weigel, Weiser, Bales, & Moyses, 2012). It is also mentioned that the Internet can offer useful information and learning opportunities, and are increasingly dependent upon this form of professional development (Marklund, 2015). As more preschool teachers enter online education to upgrade their skills or to seek greater educational opportunities, it is important to investigate their online learning experience in order to best design the most appropriate online educational settings for them (Cercone, 2008; Tolliver & Paynter, 2013).

Conceptions of learning and approaches to learning are important to consider as they could be very powerful predictors of learning outcomes (Chiou, Lee, & Tsai, 2013; Yang & Tsai, 2010). Although many studies in the line of adult education have already dealt with personal perceptions (e.g. Donaldson, Graham, Martindill, & Bradley, 2000; Kember, Jenkins, & Ng, 2003; Xie, Watkins, Golbeck, & Huang, 2012) and the uses of technology in professional development (e.g., Bennet, Priest, & Macpherson, 1999; Kenworthy, 1989), an investigation focusing on a certain special group's individual experiences in online learning environments is still necessary. Accordingly, we believe that it may be fruitful to examine preschool teachers' learning experience, comprised of their conceptions of and approaches to learning through online education.

## **Related literature**

### **Assumptions about adult learner**

Adult education is a practice where adults engage in systematic and sustained learning activities to gain new knowledge, skills, attitudes, or values (Merriam & Brockett, 2011). There have been several different definitions of an adult learner. Some definitions focus on age (e.g., Carter, 2001; Jameson & Fusco, 2014), while others emphasise breaks in traditional schooling or adoption of life course roles (e.g., Darkenwald & Merriam, 1982; Merriam & Brockett, 2011; Myers, Conte, & Rubenson, 2011). As Darkenwald and Merriam (1982; p. 9) stated, “adult education is a process whereby persons whose major social roles are characteristic of adult status undertake systematic and sustained learning activities for the purpose of bringing about changes in knowledge, attitudes, values and skills.” Based on this view, it is not the age, gender, or culture that defines someone as an adult learner, but the social roles the person is carrying out (Myers et al., 2011).

Knowles (1973) made the term andragogy (education for adults) distinct from traditional school-based pedagogy (education for children), emphasising the differences between adults learning and children learning. For example, as opposed to children or adolescents, adult learners typically are more experienced, responsible for their learning, ready to learn, life-centered, and internally-motivated (Knowles, 1973). In response to Knowles’ work, studies about understanding or facilitating adult learning have made statements about the distinctive nature of the process for adults (Boulton-Lewis, Wilss, & Mutch, 1996). Therefore, it is very imperative for educators to be aware that adult needs are very different from those of children in relation to learning (McGrath, 2009).

### **Adult online learning**

Adult learners and the ways in which they learn most efficiently have been researched and discussed for many decades. As learners, many adults have particular needs and requirements when compared with young adults and children, therefore, online instructors are often advised to carefully consider adult learners’ different learning characteristics to help them learn best (Huang, 2002). With the advent of online technology and the increasing numbers of adult students, interest in how adults learn with technology is continuing to evolve. Constructivist learning theory and many studies have made some assumptions and offer perspectives to educators of distance or online learning. For example, Huang (2002) discussed instructional principles for guiding adult learning in online environments, and concluded that constructivist principles provide useful ideas to help educators create learner-centered and collaborative environments. Other studies have emphasised issues regarding inner motivation (Merriam, Caffarella, & Baumgartner, 2012), self-direction (Burge & Frewin, 2014; Kenner & Weinerman, 2011), flexibility (Bash, 2003; Eastmond, 1998), and the process of learning (Roberson & Merriam, 2005). Most importantly, they focus on the fact that instructors should recognise adults’ learning needs, which may be different from those of children or traditional college students (Cercone, 2008).

Unlike regular students, adult learners may have biological limitations (e.g., memory decrease) or other situations (e.g., families or jobs). Therefore, suggestions for the use of andragogy while teaching with technology often include statements about its flexibility and capacity to make adult learners move through lessons anytime, anywhere, and at their own pace (Njiro, 2014). For example, in Cercone’s (2008) study on adult learners’ characteristics, two recommendations for online course development are proposed. One is to design the online learning environment based on adult learners’ limitations. The other is to consider adult learners’ individual learning experiences in online instruction. Cranton (1996) also concluded that how an individual adult learns is different and shaped by his/her personal history and contexts. Therefore, online educators have to understand their adult students to design more meaningful online learning experiences or activities for them.

### **Preschool teachers as online learners**

Online learning is defined as a virtual class that delivers information, communication, and course content via the Internet, without the physical presence of the instructors or the learners (Richardson & Swan, 2003). In general, an online learning environment includes synchronous or asynchronous communication,

web-based learning content, online resources, and technical support (Huang, 2002). Nowadays, with the fast-changing technologies, self-directed and lifelong learning has become increasingly important in our society. Many adults are pressured to continuously update their knowledge and skills in order to maintain their employability and handle new challenges. Accordingly, an increasing need for flexible and convenient learning opportunities has emerged. Online learning has greatly benefited from the development of the Internet and other technologies, and in consequence, has helped to increase educational opportunities and rights of learners from varied backgrounds (Lin, 2008).

Online educational opportunities have been demonstrated to provide access to high quality professional development for preschool educators (Stone-MacDonald & Douglass, 2014). A previous study showed that preschool teachers preferred online learning opportunities for their flexibility and autonomy (Little & King, 2008). For preschool teachers, online learning works best when there is interaction between instructors and other learning peers (Donohue, Fox, & Torrence, 2007). They depend on this form of professional development (Marklund, 2015) and tend to participate more when the online learning content is relevant to their daily work with children (Dede, 2004). It seems likely that online education can provide opportunities for preschool teachers to network with one another without location and time constraints. Unfortunately, no studies were found that have specifically explored the online learning experience of preschool teachers.

### **Conceptions of and approaches to learning**

Conceptions of learning are concerned with what the learner thinks the goals and process of learning are (Benson & Lor, 1999). In education studies, there is considerable research interest in investigating students' conceptions of learning (Marton & Booth, 1997; Prosser, Trigwell, & Taylor, 1994). In a well-known study on students' conceptions of learning, Marton, Dall'Alba, and Beaty (1993) identified six views of learning held by Western students: increasing one's knowledge, memorising and reproducing, applying, understanding, seeing something in a different way, and changing as a person. These conceptions of learning have also been divided into two distinct groups based on their similarity. The first three conceptions are seen as fragmented conceptions, which reflect no or little understanding of the relationship of the learning environment with the promoted student learning. The other three are seen as cohesive conceptions, which reflect a better understanding of the connectedness and dependency of the learning environment and student learning. The key difference between these two broader categories is the focus of meaning in learning. There has been empirical evidence suggesting that students' conceptions are related to the progress of learning activities (Tsai & Tsai, 2014), and cohesive conceptions of learning lead to better personal learning outcomes (Ellis, Goodyear, Prosser, & O'Hara, 2006).

Although overall similarities in the conceptions of learning have been identified in many studies, variations within the conceptions which are context-dependent may still occur (Marshall, Summer, & Woolnough, 1999). For example, Wood (2006) found that half of a sample of students in a doctoral program reported the highest conception in Marton et al.'s (1993) hierarchy, showing that the level of education may affect how learners conceive their learning. Lin and Tsai (2011) also found that categories for university students' conceptions of face-to-face instruction were different from those in online learning environments, indicating that the learning situation may also lead to variations in learning experience.

As with conceptions of learning, approaches to learning have also been extensively investigated in various subject domains and for different academic tasks, for example, approaches to problem solving in engineering (Marshall et al., 1999), approaches to online argumentation (Tsai & Tsai, 2014), and approaches to learning through discussion (Ellis, Goodyear, Brilliant, & Prosser, 2008). Parallel to the fragmented and cohesive distinction examined in conceptions of learning (Marton, Dall'Alba, & Beaty, 1993), approaches to learning are often distinguished into surface and deep approaches (Lin, Liang, & Tsai, 2012; Marton & Booth, 1997). Surface approaches show an orientation toward engagement with the learning environment in ways that promote reproduction, while deep approaches show an orientation toward real understanding. One consistent result of the studies is that surface approaches tend to be linked with performance of lower quality while deep approaches are more often associated with performance of higher quality (Yang & Tsai, 2010).

It is worth noting that each identified category in conceptions of, and approaches to, learning are relative in quality. Generally, it is believed that conceptions of learning are related to approaches to learning (Lee, Johanson, & Tsai, 2008; Prosser & Trigwell, 1999). For example, Prosser and Trigwell (1999) pointed out that cohesive conceptions complemented deep approaches to learning while fragmented conceptions complemented surface approaches. In sum, two approaches to learning, which are surface and deep approaches, have been identified consistently in different learning contexts. Although research undertaken by Entwistle (1997) extended the categories to a third approach defined as the strategic approach, all of these approaches are demonstrated to be associated with learners' conceptions of learning as well as with their learning performance.

### **The phenomenographic research methodology**

Research on conceptions of, and approaches to, learning aims to explore the perspectives of the learners, and recognises the vital importance of learning content and context (Benson & Lor, 1999). One of the research strategies is to compile an inventory of possible statements and then ask learners whether or not they agree with them (e.g., Biggs, 1993; Purdie & Hattie, 2002). However, this strategy may force the respondents to agree with opinions that they do not actually hold, and only gives a snapshot of a learner's experience without telling us much about the complexity of their thinking about the experience.

Another research methodology typically used to explore conceptions of, and approaches to, learning is phenomenography. Developed within educational research, this is a research approach designed to answer certain questions about how people make sense of their experience. The outcomes of phenomenographic analysis are different content-related categories describing the differences in people's ways of experiencing and conceiving their world. The epistemological assumption of phenomenography is that humans differ in how they experience the world, but these differences can be described and understood by others (Sjostrom & Dahlgren, 2002). Typically, people are asked to respond to open-ended questions about the particular phenomenon being studied. Their responses are sorted into conceptual categories on the basis of similarities and differences. It is noted that the responses gathered are the participants' expressions of their experiences, and that the analysis and outcomes are the researchers' interpretations of the participants' expressions of their experiences. Marton et al. (1993), for example, analysed interviews with British Open University students using a phenomenographic method to find that their conceptions of learning were a set of hierarchical categories ranging from "an increase in knowledge" to "changing as a person."

The importance of high-quality professional development for in-service preschool teachers has become a key issue in preschool education. It is believed that quality teacher training can help build more effective teacher-child interactions and therefore improve child learning outcomes (Howes, 1997). Recently, with the advent of web technology, rigorous empirical attention has been directed at online professional development for preschool teachers. A host of studies have aimed at developing knowledge or tools for best practice in online education programs (e.g., Downer, Locasale-Crouch, Hamre, & Pianta, 2009; Whitaker, Kinzie, Kraft-Sayre, Mashburn, & Pianta, 2007). This study, unlike the previous efforts, involved a phenomenographic approach to explore the learning experience perceived by in-service preschool teachers in online education.

### **Research purposes**

Researchers have investigated the conceptions of and approaches to learning held by different groups of students in a variety of educational contexts, such as engineering (Marshall et al., 1999), science (Tsai, 2006; Tsai & Kuo, 2008), classroom discussions (Ellis et al., 2008), and writing process (Yang & Tsai, 2010). However, most of them focused on regular students (i.e., students who are admitted to full-time studies) in formal education curricula, while little is known about learning for adult learners (i.e., students who are admitted to part-time studies, and/or have full-time jobs) in online settings. As understanding learners' online learning experience is very important in future online pedagogical design, this study aimed to examine a group of in-service preschool teachers' conceptions of and approaches to online education with a content analysis approach.

The research questions of this study are as follows:

1. What are in-service preschool teachers' conceptions of online education?
2. What are in-service preschool teachers' approaches to online education?
3. What is the relationship between preschool teachers' conceptions of and approaches to online education?

## **Method**

### **Sample**

The participants in this study were 91 in-service preschool teachers studying to gain professional development credits via online education. Most of them were from the northern part of Taiwan. Their ages ranged from 21 to 60, with the average age being 38.3. They experienced online programs beginning with face-to-face tutorials on the first occasion, and then continuing for the rest of the semester (18 weeks) online. At the end of the semester, all of them were administered open-ended written essay questions to examine their conceptions of and approaches to online education.

### **The online learning context for the study**

In the online courses, instructors and students (preschool teachers) were scheduled to meet once a week for about 2 hours in the Moodle learning system. All of the learning activities were undertaken through the online system, including watching video content, taking tests, submitting assignments, communicating in video conferences, and exchanging ideas in synchronous online forums. The students were told that their time spent in each online course activity would be measured (i.e., time spent watching online video lectures, time spent interacting with online peers, time spent interacting with the instructors, etc.) and their learning portfolios would also be recorded (i.e., participation in any online activity, grade reports of any online tests, online assignments, etc.) by the computer as a grading reference. For each online course taken, the students were required to take both mid-term and final exams on campus to ensure that they were academically achieved. The online courses included: Early Childhood English, Early Childhood Psychology Development, Parenthood in Early Childhood, Early Literacy, Movement and Music, and Health and Safety. The adult students were required to take all the online courses (12 compulsory courses with 28 credits in total) and some other face-to-face courses (13 optional courses with 32 credits in total) before getting a professional diploma in preschool education.

### **Open-ended written essay questions for gauging experience of online education**

The participants were informed that at the end of the semester they would be asked to talk about their experience of online education and they were specifically asked what they had done during the online programs. Open-ended questions administered online were used to elicit responses from the participants about the learning approaches they used and the conceptions of learning they held when taking the online courses via the Moodle learning system, video-conferencing, and online chat room. The main questions adapted from Yang and Tsai (2010) in the open-ended written essay were as follows:

1. Why did you take online education?
2. Based on your own experience, what do you think online education is?
3. What sort of things did you do to engage in online learning?
4. When you were learning through online programs, what strategies did you use and why did you use them?

Questions 1 and 2 were concerned with conceptions of online education, while questions 3 and 4 investigated the students' approaches to online education. The participants were encouraged to express their ideas freely and to provide examples in their answers. Although the traditional interview has certain advantages over requiring students to respond to open-ended questions in written format, it was not possible to interview these preschool teachers in this case because most of them were not available for face to face or telephone interviews.

## Data analysis

### Identifying the categories for conceptions and approaches

The responses to the four open essay questions were analysed by two researchers following the approach used in Ellis et al. (2006). Conceptions of online education were analysed according to the overall responses to Question 1 (Q1) and Question 2 (Q2). Approaches to online education were analysed based on the overall responses to Question 3 (Q3) and Question 4 (Q4). The process of identifying the students' conceptions of learning through online education is described below.

- Step 1: Two researchers independently read all 91 essay responses regarding students' responses in Q1 and Q2. This was the first reading of the data.
- Step 2: The researchers highlighted key ideas from the students' responses in the first reading. These highlighted responses revealed possible variations, which were the draft categories, in the conception of learning through online education.
- Step 3: The researchers engaged in the second reading of responses in Q1 and Q2. The repeated reading would help them get new insights into the data. They discussed the draft categories from the first reading until the final version of conception categories were agreed between them.
- Step 4: The final categories determined by the researchers were grouped into logically and hierarchically related categories which formed the categories for conceptions of online education.

The process described for the identification of the conceptions above was also used for that of the categories of approaches to online education in the Q3 and Q4 responses. In this study, four categories for conceptions of learning through online education and five categories for approaches to learning through online education were identified (described later).

### Analysing students' conception and approach categories

The category of conceptions of learning for each participant was then determined based on the dominant idea expressed in the responses. The process of analysing the students' conceptions of learning through online education is described with examples. For instance, one of the preschool teachers responded to Questions 1 and 2 that:

This is my first time to experience online courses. As you may know, preschool teachers are always very busy. Therefore, we don't really have much time for advanced studies. Online education is like an online store, there are increased choices and conveniences. Like online shopping, I pay the tuition and choose the online course I need at home.

In this case, the conception category was decided based on the idea associated with "a way of online shopping for knowledge or courses" (Category B, described later) due to its dominant meaning and frequency among the response sentences.

The process described for the categorisation of the conceptions above was also used for the analyses of the categories of approaches to online education in the Q3 and Q4 responses. After the initial classification of student essay responses into different categories, the data of 30 essays were chosen at random and were categorised by another researcher independently using the same categories and coding criteria. The percentage of agreement was then calculated to determine the reliability of the researchers' coding (Hayes & Hatch, 1999). The percentages of agreement for the conceptions and approaches were 73% and 80%, respectively, for the initial classifications. These percentages were increased up to 90% and 97% respectively after consultation by the two coders.

## Results

Similar to some previous phenomenographic studies (Ellis et al., 2008; Marton et al., 1993; Yang & Tsai, 2010), different categories of conceptions of, and approaches to, learning emerged and were identified after the analysis. The qualitative variations in conceptions of, and approaches to, online learning revealed in Tables 1 and 2 provide a new picture of preschool teachers' learning experience. In addition, the distribution in Table 3 shows preschool teachers' responses across different categories. Finally, Table 4 displays the associations between their conceptions of and approaches to learning.

### Conceptions of learning through online education programs

Table 1 summarises the qualitative variations in conceptions of learning through online education programs. The first column in Table 1 contains the classification letters from A to D. The second column shows the category description, and the third column presents an example from the written essay responses chosen to represent the category of conception. The categories in Table 1 are hierarchically related, ranging from simple to more complex. In Table 1, categories A and B are less complex. There is no awareness that online education is an access to lifelong learning which represents both a professional value and a complex competency. Rather, they emphasise a limited conception of learning that is more about learning for a diploma or an option for pursuing online credits. Therefore, categories A and B are regarded as fragmented conceptions of learning. On the other hand, categories C and D are conceptions underpinned by an awareness of the understanding that can arise through online education: online education as a way of adaptive learning and lifelong learning. Therefore, categories C and D are considered as cohesive conceptions of learning.

Table 1

*Categories of in-service preschool teachers' conceptions of online education*

Category	Description	Examples of essay responses by adult students
A	Online education as a way of course completion.	“The kindergarten I work in requires me to further my study and get a higher professional diploma.” “Once I complete the online program, I would be paid a higher wage.”
B	Online education as a way of online shopping for knowledge or courses.	“There are increased choices and conveniences. Like online shopping, I pay the tuition fee to choose the online courses I need at home.” “Paying for online courses is a very special experience in my life.”
C	Online education as a way of self-paced learning.	“I am a slow learner. But I don't have to worry about that because I could use extra time to review the learning materials to understand better.” “There is no time or space restriction in online education. I can undertake learning using computers anytime and anywhere.”
D	Online education as a way of lifelong learning.	“In online programs, learning has become part of my life. It is really a very convenient channel for those who are working or who have a family.” “It can help me continue my schooling outside physical schools at an older age.”

### Approaches to learning through online education

Table 2 summarises the qualitative variations in approaches to learning through online programs. The first column in Table 2 contains the classification letters from A to E. The second column shows the category description, and the third column presents an example from the written essay responses chosen to represent the category of approach. In Table 2, there is a qualitative shift between categories A, B, C and categories D and E, in which the former are focusing narrowly on taking advantage of and adapting to

online technologies, and the latter are prominent in exploring ideas and information sharing in online environments. In contrast, the former focused more on carrying out the routine procedures (such as having discourse with peers in a forum or arranging enough time for watching video lectures) while the latter revealed an intention to engage in online education for related knowledge learning (such as exploring more learning opportunities or sharing personal insights or experiences with peers). Therefore, categories A, B, and C are considered as surface approaches to learning, whereas categories C and D are thought of as deep approaches to learning.

Table 2

*Categories of in-service preschool teachers' approaches to online education*

Category	Description	Examples of essay responses by adult students
A	I engage in online education to interact with people.	“I usually interact with the instructors or learning peers in online chat rooms. Attending online chat rooms and forums is one of the course requirements.” “In the online program, I want to prove my participation. Therefore, I engage in online discussion activities.”
B	I engage in online education to manage my time.	“As the Moodle system regularly schedules the learning unit and task for each week, I have to make my study plans accordingly. I always make my own study plan to keep up with the schedule.” “Study and work are both important. I want to get more done efficiently. I need to save and use time in a better way.”
C	I engage in online education to do multiple tasks at once.	“Because time is limited, I usually have to handle many other things while I am engaging in online learning tasks.” “After work, I usually watch course videos on my pc and help my kids with their homework. I try to be a hard-working student and a responsible mother at the same time.”
D	I engage in online education to explore more online learning channels.	“When learning online, I try to explore online learning channels or tools for resolving problems, such as online dictionaries and Wikipedia.” “The online learning environment brings me a different world. I start to know many online learning websites for preschool teachers and educational websites for kids.”
E	I engage in online education to get involved in the community of sharing.	“For me, online learning is not just about learning subject matter. It is about sharing everything online with my learning peers.” “I have found many online friends who are also preschool teachers. We talk about our course assignments, work experience, kids, and even family life.”

**Associations between aspects of the student experience of learning through online education**

Table 3 shows the distribution of the responses given by the 91 participants in the sample across the categories of conceptions and approaches. Conceptions A and B are regarded as the fragmented category while conceptions C and D are considered as the cohesive category. On the other hand, approaches A, B, and C are considered as the surface category while approaches D and E are thought of as the deep category. Table 3 shows that 59.4% of the responses about the conceptions were classified as fragmented and 40.6% as cohesive, while 63.8% of the responses about the approaches were classified as surface and 36.2% as deep.



Table 3  
*The distribution of variation in conceptions and approaches (N = 91)*

Conceptions/Approaches		Categories	<i>n</i>		%
Conceptions of online education	Fragmented	A	9	9.9	59.4
		B	45	49.5	
	Cohesive	C	15	16.5	40.6
		D	22	24.1	
<b>Total</b>			<b>91</b>		<b>100</b>
Approaches to online education	Surface	A	25	27.5	63.8
		B	14	15.4	
		C	19	20.9	
	Deep	D	26	28.6	36.2
		E	7	7.6	
<b>Total</b>			<b>91</b>		<b>100</b>

Table 4 shows a statistically significant association between the conceptions of learning through online education and approaches to online education ( $X^2 = 8.658, p < 0.01$ ). The result infers that fragmented conceptions of learning through online education were closely related to surface approaches to learning through online education. Similarly, cohesive conceptions of learning through online education were closely related to deep approaches to learning through online education. For example, 36.2% of the participants reported fragmented conceptions with surface approaches and 28.6% of them reported cohesive conceptions with deep approaches. However, there were still some participants (12.1%) who reported conceptions consistent with a cohesive category, but an approach that was consistent with a surface category. Some of them (23.1%) reported approaches consistent with a deep category, but a conception that was consistent with a fragmented category.

Table 4  
*Chi-square test for different categories (N = 91)*

Approaches/Conceptions	Fragmented (N, %)	Cohesive (N, %)
Surface	33 (36.2%)	11 (12.1%)
Deep	21 (23.1%)	26 (28.6%)
Chi-square test	$X^2 = 8.658, df = 1, p < 0.01$	

While the findings confirm the general picture (i.e., conceptions of learning can be characterised on a fragmented/cohesive continuum, and approaches to learning can be distinguished on a surface/deep continuum), the study also identifies some distinctive aspects. It is interesting to note that in the conception and approach categories, the role of technology is visible. For example, category B in conceptions of learning reflects one of the Internet features which allow online purchase possible anywhere and at any time. Category C in approaches to learning also reflects the affordances of online tools which enable multiple tasks to be undertaken simultaneously.

The distribution of the responses given by the preschool teachers indicates that when studying in online environments, more of these adult learners are identified as having fragmented conceptions of learning or surface approaches to learning rather than cohesive conceptions of or deep approaches to learning. As for the associations between conceptions and approaches, although the similar fragmented conception/surface approach and cohesive conception/deep approach relations were found, a particular cohesive conception/surface approach tendency was also observed.

## Discussion and conclusion

The present study investigated the learning experience of preschool teachers in online programs. The analysis of qualitative variations in conceptions of and approaches to learning through online education provided a new picture of key features of the experience from an adult learner perspective. It is significant that this new perspective was reported in written form by adult learners (i.e., preschool teachers) undertaking online education.

In the present study, preschool teachers' conceptions of learning in online education ranged from "a way of course completion" to "a way of lifelong learning." The approaches to learning in online education ranged from "interacting with people" to "getting involved in the community of sharing." Although the previous works have identified conception and approach categories based on the experience of adult learners (e.g., Brownlee, Purdie, & Boulton-Lewis, 2003; Säljö, 1979), the variations in conceptions and approaches noted in this study show different aspects not considered previously in the literature. What is interesting is how adult learners, especially preschool teachers, described an increased awareness or focus on the learning experience brought about by online technologies.

Based on the results of the categories of preschool teachers' approaches to online education, one may suggest that the "interacting with people" category, the lowest conception in this study, be placed in a higher order in the hierarchy (i.e., the deep approach). However, in the online programs, students were actually required to interact with their peers and instructors to meet the course requirements of their program. That is to say, students in the "interacting with people" category might treat the learning task as an external imposition rather than as an internal aspect of the learning. As suggested by previous studies in approach hierarchy (Marton & Säljö, 1976; Prosser et al., 1994), in the deep approach, the intention is to extract meaning and engage in active learning processes, while in the surface approach, the intention is just to cope with the task, which sees the course as unrelated bits of information. Therefore, in the current study, students who engaged in online programs so as to interact with people are supposed to be regarded as learners with surface approaches.

It is also interesting to note the relationship among the qualitatively different categories of conceptions and approaches in this paper. The significant associations between conceptions of learning and approaches to learning are revealed in the preschool teachers' written essays. Some associations reassured us that surface approaches tended to be associated with fragmented conceptions of the learning environment, while deep approaches tended to be associated with cohesive conceptions (Chiou et al., 2013; Ellis et al., 2008; Lee et al., 2008; Tsai & Tsai, 2013; Yang & Tsai, 2010). It is therefore suggested that online educators help online adult learners develop cohesive conceptions of learning if they want to encourage them to adopt deeper approaches to learning and achieve better learning outcomes. For example, the idea emphasising the importance of online education for lifelong learning could be provided for learners to have cohesive conceptions of learning before the online courses start.

On the other hand, the distribution of students shown in Table 4 also reveals that there were some discontinuities between the preschool teachers expressed conceptions of learning and their approaches to learning through the online programs. Some of them reported a conception consistent with a cohesive category, but an approach consistent with a surface category. One possible explanation for this observation is that some of these preschool teachers with cohesive conceptions may have had problems adapting to the online learning environments (Stone-MacDonald & Douglass, 2014). For example, they may have been less familiar with online technology for learning, and thus may have been impeded in their adoption of deep approaches. It is also surprising to note that almost a quarter of them reported fragmented conceptions with deep approaches. This observation may imply that the online learning environments could probably impel some teachers toward advanced approaches despite their fragmented conceptions. Past studies have shown significant associations between students' conceptions of learning and their self-efficacy (Lin & Tsai, 2013). In this study, it is quite plausible that computer or Internet self-efficacy has played a certain role in these adult students' learning.

It may be argued that when analysing conception and approach categories, it would be very likely that each participant would have expressed experiences that could be classified within a number of the categories of description. It would be less likely that all individual participants would be able to be classified into single categories. In the current study, only one single conception and approach category for each participant was decided based on their dominant meaning and frequency among the response sentences. Therefore, future studies may consider alternative ways to assess the qualitative variation across the range of students' learning conceptions and approaches. For example, in Yang and Tsai (2010), each interview response was labeled as both a main level and an achieved level to identify not only the dominant idea but also the key idea that appeared at the highest level among the hierarchically related categories.

The advent of new technologies is providing many new opportunities for adult learners to renew their learning experience and for educators to research their understanding of learning. The qualitative categories in this study as well as the empirical relationship among these categories have provided some insights into conceptions of and approaches to learning, and have revealed aspects not considered previously. However, we must be cautious about over generalising from the findings of this study. What we have found regarding the preschool teachers here might be specific to the context of this particular online education scenario. Future studies should examine whether similar results are found in other online learning contexts. The relationship between preschool teachers' online learning experience and other variables, such as self-regulation or self-efficacy are also worth investigation. Due to the abilities of participants to express or identify their habits, approaches and behaviours, future studies may also consider other forms of data collection. Scales for measuring approaches of learning and teaching preferences (i.e., the Approaches and Study Skills Inventory for Students Instrument (ASSIST) (Tait, Entwistle, & McCune, 1998)) would be beneficial in checking this particular sample. While identifying conception and approach categories does not offer solutions to online learning challenges, decision makers and online educators will benefit by carefully considering each category as it affects the institution and its goals.

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