What Makes Learners a Good Fit for Hybrid Learning? Learning Competences as Predictors of Experience and Satisfaction in Hybrid Learning Space

Abstract

Compared with fully face-to-face or online learning environments, implementation of hybrid learning spaces is costly given the spaces making all learning options available for learners. Therefore, decisions on investments in hybrid learning are critical for institutions. Satisfaction and experience of learners is one of the important indicators for assessing the cost-effectiveness of learning space implementation; thus, predictions of learners' satisfaction and experience can inform institutions' decision-making on learning space investments. Moreover, learning competences are found correlated to learners' satisfaction and experience in general and e-learning settings. Therefore, the present study aimed at exploring predictive learning competences for hybrid learners' experience and satisfaction. A hybrid learning space was built upon a proposed model at Shanghai Open University. 211 students' learning competences and their satisfaction and experience in the hybrid learning space were examined. The results showed that except cognitive engagement competence, most predictive competences were not significantly associated with hybrid learners' satisfaction and experience. The findings indicated that since hybrid learning keeps all options available, to experience satisfying learning, students need not have certain competences but cognitive engagement competence, which is correlated to learners' cognitive ability to figure out the right mix of learning options.

Practitioner Notes

What is already known about this topic

- The essence of hybrid learning is flexibility in terms of time, space and pace of learning that empowers learners to find the right mix for themselves out of all options available which could be offline or online, synchronous or asynchronous.
- Learner satisfaction is a key factor in evaluating the effectiveness of any learning program and facility.
- Factors related to learning competences such as motivation, engagement, and digital literacy are found correlated to learners' satisfaction in general learning or e-learning settings.

What this paper adds

- A practical model for practitioners to realize a hybrid learning space that has a high level of flexibility in terms of time, space, and pace of learning.
- Most competences found predictive to general or e-learners do not significantly predict hybrid learners' satisfaction and experience.
- Cognitive engagement is the only learning competence associated with learners' satisfaction and experience in hybrid learning spaces. This may be attributed to its helping learners cognitively explore and thus find the right mix of learning to have satisfying experience.

Implications for practice and/or policy

- In order to predict whether hybrid learning implementation is cost-effective, being able to predict hybrid learner satisfaction is important.
- Students' ability of cognitive engagement should be examined and inform institutions' decisions on hybrid learning implementation due to its association with hybrid learner satisfaction and experience.

Introduction

Boosted by rapid development of information technology, the learning landscape has been shaped tremendously. Learning spaces have been evolving from traditional face-to-face classrooms through online environments to hybrid learning spaces (Childs & Peachey, 2013). Hybrid learning spaces can be defined as learning spaces that blur the boundary between physical and virtual environments where online learners and offline learners and instructors still can interact with each other and the course content can be delivered synchronously and asynchronously by using digital tools, mimicking real-time communication (Akkoyunlu & Soylu, 2006; Staker, 2011). Given all options in terms of time, space, and pace of learning available to learners, the present study further argues that one of the essential features of hybrid learning spaces is that they enable

learners to find the right mix for themselves.

However, hybrid learning implementation might be costly since it makes all learning options available for learners. Decisions on learning program and facility investments should take the cost-effectiveness into account. In order to understand whether it is cost-effective, being able to predict student satisfaction before the investments is important since learner satisfaction is a key factor in evaluating the effectiveness of any learning program (Wiechowski & Washburn, 2014; Alsadoon, 2018). A high level of learner satisfaction may reflect that learners are willing to experience the same learning again and thus bring about lower attrition rates and better academic achievement (Chute et al., 1999; Lin et al., 2008; Kuo, 2014), which makes an educational investment (e.g. building hybrid learning spaces in institutions) cost-effective.

Many studies have been investigating predictors of learner satisfaction. Factors related to learning competences are found correlated to learners' perceived satisfaction and experience (Keramati et al., 2011; Topal, 2016) in different settings. Motivation competences (including learning self-efficacy, intrinsic and extrinsic goal orientations) and engagement competences (including cognitive, emotional, or behavioral engagement) are shown predictive to learning satisfaction and experience in general learning settings (Lin et al., 2008; Banfield & Wilkerson, 2014). Moreover, above and beyond the two general learning competences, digital literacy is another competence specifically for predicting e-learner satisfaction and experience (Sun et al., 2008; Beqiri et al., 2009).

However, in terms of hybrid learning spaces, whether the same competences can be applied for hybrid learners' experience and satisfaction prediction is seldom discussed. Moreover, whether there is another competence predictor specifically for hybrid learning is also rarely investigated. For example, it is plausible to assume that time management, an ability to self-regulatedly and behaviorally arrange study time, space, and pace (García-Ros et al., 2004) to be the predictor given the high flexibility of hybrid learning that makes students autonomous regarding the time, place, pace of learning. Therefore, the present study conducted a study examining the motivation and engagement competences, digital literacy, and time management competence of 211 students at Shanghai Open University before their studying at a hybrid learning space that enables them to find the right mix for themselves. At the end of the course, their experience and satisfaction with hybrid learning were measured to address three primary research questions, as listed below.

1. Do the competences of learning motivation and engagement predicting experience and satisfaction in general settings also predict that with hybrid learning?
2. Does the competence of digital literacy specifically predicting e-learning

satisfaction and experience predict that in hybrid learning as well?

3. Would the competence of time management be a distinctive predictor of hybrid learners' satisfaction and experience?

Literature review

From Classrooms through e-Learning Platforms to Hybrid Learning Spaces

For a long time, physical settings and instructors had been the only two key elements comprising learning spaces or so-called classrooms. On the other hand, learners were just for complementing the instructor-centered physical spaces (Reh, et al., 2011). Although issues regarding how these traditional environments reduce a student's sense of autonomy, decrease intrinsic motivation, and result in negative attitudes and performance had been discussed for a long time (Grolnick & Ryan, 1987; Miserandino, 1996; Rovai et al., 2007), the traditional learning spaces were still dominant until the late 1990s when information technology revolution shaped the landscape of education (Stokes, 1999; Al-Qahtani & Higgins, 2013).

The implementation of IT in the field of education essentially changes the way of learning content delivery, which removes the physical constraints of traditional learning imposed on learners. The concept of digitally delivered learning such as e-learning and distance learning thus were developed. These terms represent a form of learning programs that present physical classroom-based instructional content over the Internet, not only affecting the way learners perceive their educational environment but also influencing their learning experience. According to Klesius et al. (1997), e-learning is more likely to attract students to experience and participate in learning activities than traditional learning since it is cost-effective and efficient in terms of time for commuting. Moreover, educational institutions also benefit from e-learning due to its low level of requirement for physical facilities (e.g. number of classrooms) (Al-Musa & Al-Mobark, 2005).

However, studies found that students are substantially less likely to complete online courses compared with face-to-face traditional ones (Carpenter et al., 2004; Jaggars & Xu, 2011; Zavarella, 2008). Although e-learning spaces benefit learners in terms of cost-effectiveness and time efficiency, there are negative impacts of fully e-learning such as lack of communication skill development due to asynchronous digital content delivery (Al-Qahtani & Higgins, 2013; Klein & Ware, 2003). Moreover, different learners in different contexts may have different preferences for certain ways of course content delivery (Graham et al., 2005). Lack of the flexibility of switching between online learning spaces and offline face-to-face classrooms for personal needs makes

neither fully face-to-face nor fully online learning environments meet the needs of a wide spectrum of learners.

Responding to the challenge in modern learning spaces, a new concept "hybrid learning spaces" has been being developed; similar terms such as blended learning and mixed-model learning are also used interchangeably in current research (Martyn, 2003). Since the concept is still burgeoning (compared with traditional and e-learning settings), it has a wide array of definitions. Thorne (2003) and Garnham and Kaleta (2002) described it as a learning space where course content is delivered using a combination of conventional seminars and electronic communication tools. Ferdig et al. (2012) regarded hybrid learning as a pedagogical approach merging face-to-face instruction with computer/mobile-mediated instruction but the latter is built to complement the former in order to cut down inefficient time students spend in classrooms. Trentin (2015) argued that it was not only about complement but also parallel—both physical and virtual settings in hybrid learning should deliver parallel interaction between learners, peers, and instructors. Boelens et al. (2018) and AlKhaleel (2019) both further added to that, pointing that it should be coupled with a high degree of flexibility that learners can have multiple choices in terms of time and place of learning of which each provides parallel learning experience.

Distilling from the various definitions, the present study considers its essence to be the flexibility that empowers learners to find the right mix for themselves out of all time and spatial options which could be offline or online, synchronous or asynchronous. Unlike fully face-to-face and fully online learning environments, in hybrid learning learners can freely choose to attend sessions in classrooms, participate online, asynchronously, or synchronously according to their preference in terms of time, space and pace (Staker, 2011; Jokinen & Mikkonen, 2013; Lee et al., 2012).

Learning Competences and Learner Satisfaction and Experience

Hybrid learning spaces are developed to blur the borderline between traditional classrooms and e-learning platforms, asynchronous and synchronous learning to offer all options available for learners. Given that, the cost of building hybrid learning spaces in institutions is higher than fully face-to-face or purely online learning. Therefore, whether to invest in hybrid learning spaces and implement hybrid learning is critical to institutions' decision-makers. In order to estimate whether it will be cost-effective, being able to predict student satisfaction with hybrid learning before the investment is important since learner satisfaction is a key factor in evaluating the effectiveness of any learning program (Wiechowski & Washburn, 2014; Alsadoon, 2018). A high level of learner satisfaction may reflect that learners are willing to experience the same learning

again and thus bring about lower attrition rates and better academic achievement (Chute et al., 1999; Lin et al., 2008; Kuo, 2014).

There already have been many studies investigating predictors of learner satisfaction in different settings (e.g. general classroom learning or distance learning) and factors related to learning competences are found correlated to learners' satisfaction and experience (Keramati et al., 2011; Topal, 2016). Learning competences can be defined as skills and knowledge that enable learners to be ready, eager, and prepared to make benefit of a learning experience (Dada, 2006). In terms of experience in typical classroom settings, learning competences related to motivation and engagement are shown associated with general learner satisfaction (Lin et al., 2008; Banfield & Wilkerson, 2014).

Motivation competence can be regarded as the ability to motivate oneself to learn, which is composed of two elements: expectancy and value elements (Pintrich & De Groot, 1990; Hsieh, 2014). The former refers to learners' self-efficacy expectancy as motivation for learning that contributes to learners' satisfaction in general settings (Banfield & Wilkerson, 2014); the latter refers to learners' perception of intrinsic and extrinsic values of learning in general. Either intrinsically or extrinsically motivated learners are predicted to be satisfied with learning experience (Ray et al., 2003; Wigfield et al. 2006). Moreover, learners' abilities to focus on learning such as how much cognitive effort they can make to learn (i.e. cognitive engagement ability), identifying themselves with peers and lecturers (i.e. emotional engagement ability), and behavioral involvement in learning activities (i.e. behavioral engagement ability) are also found in many studies to be the predictors (Moore & Lippman, 2004; Lin, 2008; Hsieh, 2014).

In terms of e-learning settings, the same engagement (Lee, 2000; Richardson & Long, 2003; Paechter et al., 2010; Nawrot & Doucet, 2014) and motivation (Lin et al., 2008; Paechter et al., 2010; Ilgaz & Gülbahar, 2015) competences are also found predictive to learners' satisfaction and experience in e-learning learning. Moreover, above and beyond the general predictive competences (i.e. motivation and engagement), digital literacy is shown specifically another competence predicting e-learner satisfaction.

Many studies indicate that technological knowledge, especially in the aspect of digital literacy, is an important factor to e-learning experience. Piccoli et al. (2001) found that a lack of internet knowledge would hamper e-learning satisfaction. Beqiri et al. (2009) and Sun et al. (2008) found out that learners have acquired sufficient computer competence are more satisfied with e-learning. Wu et al. (2010) stated that a higher level of individual computer self-efficacy is positively associated with a higher level of e-learning satisfaction. Maphosa & Bhebhe (2019) also found digital literacy boosted

students' e-learning confidence. Other studies (Lee, 2000; Machado, 2007; Pena & Yeung, 2010; Ali, 2012) investigated a similar phenomenon and concluded that satisfaction decreases in parallel with a decrease in digital literacy. These studies together indicated that even though over the last two decades technology has been in almost every part of our life and thus being digitally literate seems not an issue anymore, digital literacy is still a must for e-learning and shown to predict e-learning satisfaction and experience.

Although many studies have found competences such as motivation, engagement, or digital literacy are factors to predict general learning or e-learning experience, whether they can be applied in predicting hybrid learners' satisfaction is seldom discussed. Moreover, whether there is another competence that can be a specific predictor in hybrid learning spaces is worth investigating. For example, given that the high flexibility of hybrid learning makes students autonomous to make choices freely regarding the time and place of learning process (Banditvilai, 2016; Gecer & Dag, 2012; Purnawarman et al., 2016), developing responsibility for study time, space, and pace may be important for having a successful hybrid learning experience. Therefore, it is plausible to assume that time management skills, a self-regulatory competence of study time in different learning environments and pace (García-Ros et al., 2004), may be a specifically predictive competence for hybrid learners' satisfaction and experience.

Methods

Hybrid Learning Space at Shanghai Open University

Based on definitions of hybrid learning spaces in literature, the present study proposed a practical model (See Figure 1) for practitioners to realize and practice a hybrid learning space that has a high level of flexibility for learners' preferences in terms of time, space, and pace of learning. A hybrid learning space was built upon the model in a finance course at Shanghai Open University for research purposes.

In the hybrid learning space, a live-broadcasting platform plays an intermediary role that bonds distance learners and on-site instructors and learners together with a chat room for interactive texting and an instant audio/video call system, mimicing real-time communication—which makes both online and offline synchronous learning options available for learners. In terms of asynchronous learning, all synchronous interactions (including texts in the chat room) on live streaming would be recorded and uploaded on LMS platforms where learners and instructors can watch the videos and interact asynchronously on the LMS forum. Moreover, not only can the same lectures be delivered in different ways (i.e. online or offline, asynchronous or synchronous), but also learners are allowed to switch between different learning ways for exploration to

find the right mix of different learning ways for themselves—the flexibility of hybrid learning spaces in terms of time, space, and pace is realized.

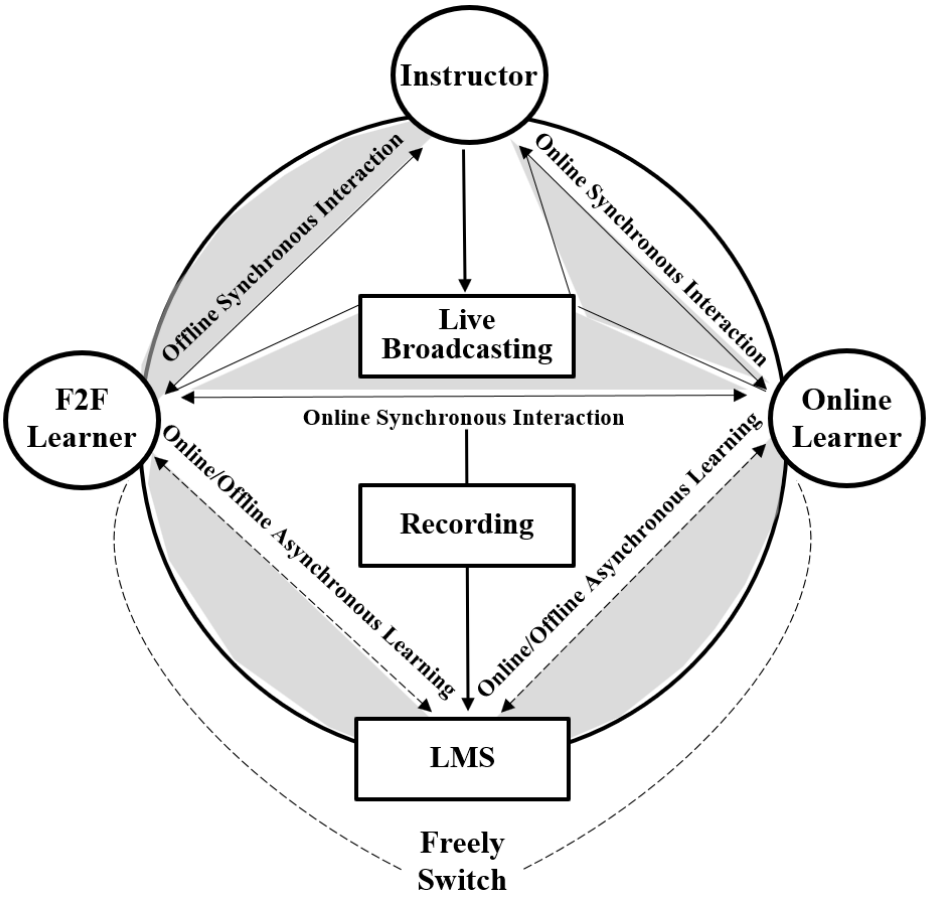

Figure 1. Hybrid Learning Space Realized with Live-Streaming Techniques

Participants and Procedure

211 students enrolled in the finance course at the hybrid learning space of Shanghai Open University and consented to participate in the study. The demographic data of the sample was shown in Table 1, which would be background variables for data analysis. A questionnaire survey was conducted to examine their general learning competences: motivation (i.e. self-efficacy, intrinsic and extrinsic goal orientations) and engagement (i.e. cognitive, emotional, and behavioral engagement) competences, e-learning specific competence (i.e. digital literacy), and candidate competence for hybrid learning (i.e. time management). Their satisfaction and experience in the hybrid learning space were examined by a following survey at the end of the course.

Table 1. Basic Information of Participants

Attribute	*Classification*	*No. of Samples*	*Percentage*
Gender	Men	77	36.5%
	Women	134	63.5%
Age	0 ~20 years old	2	0.9%
	20~30 years old	97	46.0%
	30~40 years old	103	48.8%
	40~50 years old	8	3.8%
	50~60 years old	1	0.5%
Major	Finance major	125	59.2%
	Other majors	86	40.8%

In terms of the two general learning competences, the corresponding survey items were adapted and modified from two instruments: Pintrich et al.'s (1993) Motivated Strategies for Learning Questionnaire (MSLQ) and Dogan's (2014) Student Engagement Scale (SES). For the purposes of the present study, the items measuring self-efficacy, intrinsic and extrinsic goal orientations in MSLQ were selected and adjusted, and items measuring cognitive, emotional, and behavioral engagement abilities in SES were taken and revised. In terms of the e-learner competence, digital literacy items were built upon ICT Competence Questionnaire of Sun et al. (2008). And items measuring the time management competence were based on Learning Readiness Scale of Ilgaz and Gülbahar (2015). Finally, a 34-item instrument was developed and a reliability test was conducted. The reliability coefficients of each competence were shown in Table 2. All Cronbach's Alpha was higher than .8, which indicates a good level of reliability.

Table 2. Reliability Test on Competence Items

Predictive Variable	*Item*	*Cronbach's Alpha*
Cognitive Engagement	6	.950
Behavior Engagement	4	.939
Emotional Engagement	3	.897
Self-efficacy	5	.947
Intrinsic Motivation	4	.943
Extrinsic Motivation	4	.834
Digital Literacy	4	.912
Time Management	4	.928

Data Analysis and Result

Data Analysis

Hierarchical regression was conducted in a way shown in Figure 2. Learner background information such as gender, major, and age shown in Table 1 is regarded as a block of control variables of which effects should be removed before the assessment of effects of predictive variables of interest (i.e. learning competences in general, e-learner competence, and candidate competence for hybrid learning). In addition to the block containing control variables, the first two blocks are the blocks of engagement and motivation competences since both are considered general learning competences (i.e. for both traditional and e-learning settings) in literature. The logic of entering the engagement block before the motivation block is based on literature (Hsieh, 2014) showing engagement competences explained more variance of learning satisfaction and experience, a part of which is shared with motivation competences. The e-learning specific competence is the fourth block and the candidate hybrid learning competence is the last. The dependent variables are learners' experience and satisfaction.

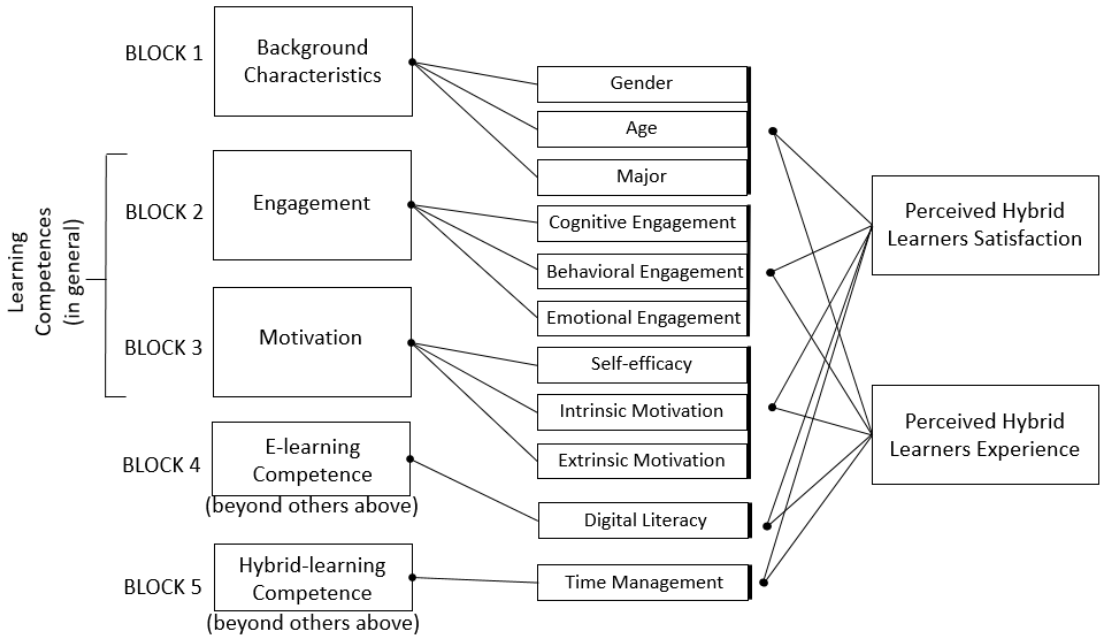

Figure 2. Hierarchical Regression on Satisfaction and Experience

Hybrid Learner Satisfaction

Table 3. Desciptive Statistics of Perceived Hybrid Learners' Satisfaction

			Bootstrap			
					95% Confidence Interval	
		Stats	*Bias*	*SE*	*Lower*	*Upper*
Perceived hybrid learners' satisfaction	Valid N	211				
	Mean	3.296	-.001	.049	3.199	3.393
	SD	.7129	-.0029	.0318	.6484	.7724
	Variance	.508	-.003	.045	.420	.597
	Skewness	-.696	.014	.122	-.933	-.452
	Kurtosis	-.390	-.028	.320	-.946	.330

a. bootstrap results are based on 1000 bootstrap samples

b. satisfaction is measured on a 4-point likert scale

The descriptive statistics of hybrid learners' satisfaction is shown in Table 2 above. When satisfaction is the dependent variable, a model summary by ANOVA and results of the hierarchical regression analysis are shown in Table 3. The first model only containing the first block (i.e. control variables) explains 2.9% of its variance, which is not significant (F = 2.089 and p-value = .103); the second model containing the first and the second blocks can explain 16.4% of its variance, which is significant (F = 6.649 and p-value < .001); the third model containing the first and the next two blocks (i.e. predictive competences in general learning) explains 17.7% of the variance, which is significant (F = 4.796 and p-value < .001); the fourth model containing the fourth block additionally (i.e. e-learning competence) explains 17.8% of the variance, which is significant (F = 4.324 and p-value < .001); the full model explains 18.9% of the variance (F = 4.212 and p-value < .001). However, only the R square increase from the first model to the second one is significant ($\triangle R$ square = 13.4%, $\triangle F$ = 10.910, and p-value < .001), which indicates that only the block of engagement competences can predict hybrid learners' satisfaction. More specifically, within the block, only cognitive engagement is significantly correlated to satisfaction.

Table 4. Hierarchical Regression on Perceived Hybrid Learners' Satisfaction

Predictor	*Block1β*	*Block2β*	*Block3β*	*Block4β*	*Block5β*
Block1 Background characteristics					
Gender	.113	.101	.079	.081	.074
Age	-.072	-.059	-.044	-.042	-.046
Major	-.169*	-.173*	-.163*	-.161*	-.167*
Block2 Engagement					

Cognitive engagement		.448***	.462*	.434*	.409*
Behavioral engagement		-.304	-.268	-.265	-.310
Emotional engagement		.199	.231	.219	.240
Block3 Motivation					
Self-efficacy			-.102	-.105	-.178
Intrinsic motivation			-.088	-.093	-.102
Extrinsic motivation			.146	.145	.141
Block4 E-learning competence					
Digital literary				.053	.014
Block5 Hybrid learning competence					.193
Time Management					
R^2	.029	.164	.177	.178	.189
F	2.089	6.649***	4.796***	4.324***	4.212***
p-value	.103	.000***	.361	.627	.100
$\triangle F$	2.089	10.910***	1.075	.237	.2.724
$\triangle R^2$	.029	.134	.013	.001	.011

n.s $p>.05$ *$p<.05$ ***$p<.001$

Hybrid Learner Experience

Table 5. Desciptive Statistics of Perceived Hybrid Learners' Experience

			Bootstrap			
					95% Confidence Interval	
		Stats	*Bias*	*SE*	*Lower*	*Upper*
Perceived hybrid learners' experience	Valid N	211				
	Mean	3.277	-.001	.051	3.180	3.377
	SD	.7449	-.0026	.0296	.6818	.7995
	Variance	.555	-.003	.044	.465	.639
	Skewness	-.626	.016	.132	-.873	-.365
	Kurtosis	-.579	-.038	.328	-1.170	.076

a. bootstrap results are based on 1000 bootstrap samples

b. experience is measured on a 4-point likert scale

The descriptive statistics of hybrid learners' experience is shown in Table 5 above. When experience is the dependent variable, a model summary by ANOVA and results of hierarchical regression analysis are shown in Table 6. The first model only containing

the first block (i.e. control variables) explains 1.2% of its variance, which is not significant (F = 0.855 and p-value = 0.465); the second model containing the first and the second block can explain 7.2% of its variance, which is significant (F = 2.649 and p-value = 0.017); the third model containing the first and the next two blocks (i.e. predictive competences in general learning) explains 9.6% of the variance, which is significant (F = 2.364 and p-value = 0.015); the fourth model containing the fourth block additionally (i.e. e-learning competence) explains 10.2% of the variance, which is significant (F = 2.278 and p-value = 0.015); the full model explains 10.3% of the variance (F = 2.069 and p-value = 0.024). However, in terms of R square increases, the result is the same as satisfaction; only the R square increase from the model one to the model two is significant ($\triangle R$ square = 6.0%, $\triangle F$ = 4.401, and p-value = 0.005), which indicates that only engagement can predict hybrid learners' experience. Similarly, within the block, only cognitive engagement is significantly associated with experience.

Table 6. Hierarchical Regression on Perceived Hybrid Learners' Experience

Predictor	*Block1β*	*Block2β*	*Block3β*	*Block4β*	*Block5β*
Block1 Background characteristics					
Gender	.096	.091	.052	.506	.058
Age	-.055	.051	-.037	-.030	-.030
Major	-.082	-.087	-.070	-.065	-.064
Block2 Engagement					
Cognitive engagement		.381*	.437*	.364*	.368*
Behavioral engagement		-.179	-.106	-.099	-.091
Emotional engagement		.000	.071	.041	.037
Block3 Motivation					
Self-efficacy			-.116	-.123	-.110
Intrinsic motivation			-.214	-.226	-.224
Extrinsic motivation			.168	.167	.168
Block4 E-learning competence					
Digital literary				.138	.145
Block5 Hybrid learning competence					
Time Management					-.034
R^2	.012	.072	.096	.102	.103
F	.855	2.649*	2.364*	2.278*	2.069*
p-value	.465	.005*	.161	.228	.780
$\triangle F$	.855	4.401*	1.736	1.462	.078
$\triangle R^2$	.012	.060	.023	.007	.000

n.s p>.05 *p<.05 ***p<.001

Discussion

In response to the research questions, through hierarchical regression, the present study found that only engagement competences (specifically, cognitive engagement) are able to predict learners' satisfaction and experience in hybrid learning settings. However, since hierarchical regression analyses are sensitive to the order of block or variable entry, the results might be mainly affected by the order of regressed blocks or categorization of variables even though the ways the study entered blocks and categorized variables are based on literature.

Therefore, a forward-selection stepwise regression was conducted for identifying the significance of the 11 variables by an algorithmic and automatic procedure without theories behind to decide the order of variable entry and variable selection. In the stepwise regression process, a predictive variable is considered for addition based on the significance of its R square increase.

In terms of either satisfaction or experience as the dependent variable, the results of stepwise regression shown in the tables from Table 7 to Table 10 are similar to that of hierarchical regression. Only cognitive engagement can predict satisfaction and experience in hybrid learning settings.

Table 7. Variable Selection by Stepwise Regression on Satisfaction

					Change Statistics	
Model	*R*	*R Square*	*Adjusted R Square*	*Std. Error of the Estimate*	*R Square Change*	*F Change*
1	.343	.118	.114	.6712	.118	27.943

a. Predictors: (Constant), Cognitive Engagement

b. Dependent Variable: Satisfaction

Table 8. Excluded Variables by Stepwise Regression on Satisfaction

						Collinearity Statistics
Model		*Beta In*	*t*	*Sig.*	*Partial Correlation*	*Tolerance*
1	gender	.050	.769	.443	.053	1.000
	age	-.073	-1.125	.262	-.078	1.000
	major	-.113	-1.740	.083	-.120	1.000
	behavior engagement	-.161	-1.265	.207	-.087	.261
	emotional engagement	.055	.519	.605	.036	.370

self-efficacy	-.134	-.964	.336	-.067	.218
intrinsic motivation	-.106	-.862	.389	-.060	.278
extrinsic motivation	.139	1.641	.102	.113	.582
digital literacy	.072	.676	.500	.047	.377
time management	.098	.926	.356	.064	.374

Table 9. Variable Selection by Stepwise Regression on Experience

					Change Statistics	
Model	*R*	*R Square*	*Adjusted R Square*	*Std. Error of the Estimate*	*R Square Change*	*F Change*
1	.226	.051	.047	.7274	.051	11.263

a. Predictors: (Constant), Cognitive Engagement

b. Dependent Variable: Experience

Table 10. Excluded Variables by Stepwise Regression on Experience

						Collinearity Statistics
Model		*Beta In*	*t*	*Sig.*	*Partial Correlation*	*Tolerance*
1	gender	.067	.994	.321	.069	1.000
	age	-.060	-.887	.376	-.061	1.000
	major	-.035	-.523	.601	-.036	1.000
	behavior engagement	-.192	-1.460	.146	-.101	.261
	emotional engagement	-.083	-.747	.456	-.052	.370
	self-efficacy	-.220	-1.531	.127	-.106	.218
	intrinsic motivation	-.245	-1.932	.055	-.133	.278
	extrinsic motivation	.134	1.528	.128	.105	.582
	digital literacy	.099	.903	.367	.063	.377
	time management	-.081	-.738	.461	-.051	.374

In light of these outcomes, there are some points worth discussion. First of all, except cognitive engagement, most of the competences shown predictive to student satisfaction and experience in general learning and e-learning settings in literature do not significantly predict hybrid learners' satisfaction and experience in the present study. This finding shows that to have satisfying experience of hybrid learning, students do not need to have the competences that are associated with learning in general or e-learning (except cognitive engagement). This may be attributed to the feature of hybrid learning that provides all options available among which learners are able to explore and find one with which they are satisfied. For example, students without digital literacy

to succeed in purely e-learning settings can still choose to learn in classrooms in hybrid learning spaces and feel satisfied. In other words, since hybrid learning provides all options available to learners, there is no prerequisite learning competence (except cognitive engagement) for having satisfying experience and thus most of the learning competences are not as predictive as they are in other learning settings.

A second point for discussion is why cognitive engagement competence is the only predictor for hybrid learning experience and satisfaction. The finding may be linked to other studies showing that cognitive and metacognitive strategy use is particularly important in hybrid learning since students who use cognitive strategies to plan and organize learning options are able to explore and find the "right" mix of options their own (Sun & Rueda, 2012; Halverson & Graham, 2019). Moreover, the cognitive ability to plan and organize learning options is not necessarily equal to time management skills because the former is more referred to an ability to "cognitively explore" and thus find the right mix of learning environment, pace, and time options; the latter is more about an ability to "behaviorally arrange" study time, space, and pace (García-Ros et al., 2004).

Besides the variables in the learner dimension (i.e. competences), variables in other dimensions are worth discussion as well. Although the present study only focused on the leaner dimension (since it aims at predicting whether target learners can fit hybrid learning in order to inform decision-making on hybrid learning implementation), other dimensions such as instructor, curriculum, or course may also affect learners experience and satisfaction. For example, some studies have shown that instructor attitude toward e-learning (i.e. instructor dimension), e-learning course quality (i.e. curriculum dimension) and perceived usefulness of course content (i.e. course dimension) are the critical factors affecting e-learners' perceived satisfaction (Sun et al., 2008). Therefore, whether these dimensions affect hybrid learner experience and satisfaction is worth future works' exploring as well.

It is worth mentioning that although the present study regarded student's demographic backgrounds as control variables in hierarchical regression, in terms of satisfaction specifically, students' majors have significant regression coefficients shown in Table 4; the finding found that students majoring in finance will be more satisfied with hybrid learning. It is plausible that hybrid learning satisfaction is affected by course content satisfaction given that students majoring in finance may be more satisfied with finance-related course content than other students. Moreover, other studies also showed that students' majors play an important role in learning experience as well (Chang, 2011; Hsieh, 2014). Therefore, the present study suggests that if major is not a variable of interest, it must be experimentally controlled or at least statistically controlled as the

present study did.

According to the results of the study, some implications are considered for researchers and practitioners. The study contributes to an actionable model that could help practitioners practice hybrid learning spaces with a high level of flexibility for learners' preferences in time, space, and pace. Moreover, due to the cost of building hybrid learning spaces, it is critical for institutions' decision-makers to identify whether students of schools or universities fit hybrid learning before investment. The present study suggests that measuring cognitive engagement competences of students is necessary. The higher cognitive engagement with which the majority of target students are, the more likely they will fit hybrid learning spaces—it is more cost-effective for hybrid learning implementation.

Finally, the present study also had limitations. First, the participants were not randomly assigned or recruited to attend the course offered in the hybrid learning space; thus, it is possible that the perceived learning satisfaction and experience may be biased by the effect of self-selection. Another limitation was that although in the hybrid learning space students can freely switch between online and onsite learning spaces, there may be some participants who have a strong preference to participate offline or online and thus only took the course in the classroom, only watched live streaming videos of the course, or only watched the recorded videos throughout the whole semester. As a result, their learning experience or competence would only reflect fully traditional learning or fully digital learning. Future studies will further investigate if such a pattern exists and withdraw these subjects from data analysis to validate the findings. Last but not least, in terms of measuring hybrid learners' experience and satisfaction, the present study only focused on the aspects of their willingness to experience again, perceived fitness and satisfaction with the hybrid learning, but other aspects such as perceived usefulness, convenience, and so on should be considered as well.

Conclusions

Many studies have been investigating predictors of learner satisfaction in different settings. Motivation and engagement competences are found predictive in general; above and beyond these competences, digital literacy is another predictor in e-learning settings. The present study raised questions about whether these competences used to be exploited as predictors in traditional and e-learning settings can be applied in hybrid learning spaces as well. Moreover, given the flexibility in terms of time, space, and pace of hybrid learning, it is possible that time management competence may be another predictor specific for hybrid learner satisfaction and experience.

Through hierarchical and stepwise regression analyses on the competence and

satisfaction data from 211 hybrid learners at Shanghai Open University, the results showed only the cognitive engagement competence can predict hybrid learner satisfaction and experience. Most of the predictive competences for either general or e-learners' satisfaction do not work in the hybrid learning space. The present study argued that the findings may be attributed to the feature of hybrid learning: all learning options are available for learners to find the right mix for themselves (and thus there is no prerequisite of competences to have satisfying learning experience). However, to successfully find the right mix of learning options, learners still need to be able to use cognitive strategies to explore, plan, and organize learning options. It indicates that cognitive engagement is a critical indicator of hybrid learners' experience and satisfaction, providing insights to inform institutions' decisions about hybrid learning implementation.

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Statements on open data, ethics and conflict of interest

The present study adhered to the guidelines and ethical standards as the nature of study demanded and original data can be provided upon request. Participants were provided with the details about the study and were informed that their participating or not participating would not have any effect on their grades. Their participation was voluntary at their consent. The authors declared that there is no conflict of interest in this work.

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