

The role of gender and employment status in MOOC learning: An exploratory study

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Abstract

Background: Learners in a given massive open online course (MOOC) are usually provided with the same learning materials, guided by the same syllabus, and assessed in the same format. This “one-size-fits-all” approach constrains learners' ability to reap the optimal benefits from online learning.

Objectives: This study aims to characterize learners' differences in MOOC learning. Specifically, it examines how learners might vary in their enrolment motivation and the development of continuance intention to learn in a MOOC because of their gender and employment status.

Methods: Data were collected via a questionnaire survey. Quantitative and qualitative methods were used to analyse data from 664 learners in a Chinese MOOC.

Results and Conclusion: The research revealed significant differences in learners' enrolment motivation across groups defined by employment status, but not for gender groups. Learner groups defined by gender and employment status experienced variant psychological processes when deciding to continue to learn in the MOOC.

Major Takeaways: Working adults stressed the instrumental values derived from MOOC learning; therefore, it is vital to design and integrate additional features into the MOOC to satisfy their needs. Besides, it would be critical to understand female learners' and working adults' expectations of MOOC learning, as they are more sensitive to confirmation in determining their attitudes toward learning in a MOOC. A short pre-course survey of learners' expectations would serve the purpose.

KEYWORDS

continuance intention, employment status, gender, MOOCs, motivation

1 | INTRODUCTION

Massive open online courses (MOOCs) are a recent educational endeavour to broaden public access to higher education (Stich & Reeves, 2017). It has grown into a scale of 120 million learners, 13,500 courses, and 50 online degrees from more than 900 universities worldwide (Shah, 2020). The Covid-19 pandemic has “intensified the drive to

online education” (Rahman et al., 2021, p. 1514). Coursera added 10 million users within 2 months (from mid-March to mid-May 2020), seven times more than the previous year (Lohr, 2020). However, the openness of MOOCs gives rise to the challenge of devising appropriate pedagogies to suit a learner body heterogeneous in multiple ways: age, geographical location, employment status, educational attainment, skillset, and learning pattern (Haniya & Paquette, 2020).

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Studies addressing learners' differences have already demonstrated the benefits of personalized instruction in promoting learning performance both in classroom learning (Fernald & Du Nann, 1975) and web-based learning (Chen, 2008). MOOCs have empowered learners to choose learning location, time, and subject. However, the current format of MOOCs is still far from facilitating personalized learning, as in most cases, learners in a given MOOC are provided with the same learning materials, guided by the same syllabus, and assessed in the same manner (Davis et al., 2017). This "one-size-fits-all" approach limits "learners' ability to reap the full benefits of online educational resources" (Kizilcec et al., 2017, p.121).

To respond to Ng's (2019) call for more research to address diverse online learners' needs through differentiation, we examine differences in MOOC learning across groups defined by gender and employment status, because (a) MOOCs facilitate the opening of educational resources to those traditionally unserved learners, for example, women with multiple roles in life and working adults with schedules incompatible with the residential course arrangements; and (b) previous empirical evidence has supported the association between learners' gender and employment status with their persistence and achievements in MOOCs (Cisel, 2014; Crues et al., 2018; Li, 2019).

Furthermore, past studies have evidenced that motivation to enrol in a MOOC (hereafter referred to as motivation) and continuance intention to learn in a MOOC (hereafter referred to as continuance intention) are two critical psychological mechanisms explaining learners' varied learning behaviours and outcomes (Dai, Teo, Rappa, & Huang, 2020; Maya-Jariego et al., 2020; Zheng et al., 2015). Zhu et al. (2020) reviewed 541 studies of MOOCs published from 2009 to 2019 and concluded that learner-focused research, primarily learners' motivation and completion, was an important theme in this research body and continued to attract increasing scholarly interest. However, few have examined how gender and employment status might interact with learners' motivation and continuance intention, resulting in various learning behaviours and outcomes (see Figure 1).

This study explores how learners might vary in motivation and the development of continuance intention because of their gender and employment status. Specifically, its goals are to address two research questions as follows:

RQ1: Are learner groups defined by gender and employment status motivated by different reasons for learning in a MOOC?

RQ2: Is the development of learners' continuance intention to learn in a MOOC variant across the learner groups defined by gender and employment status?

Exploring and explaining different learner groups' psychological processes underlying variant behavioural patterns and/or learning outcomes can yield more insights for the adaptive design of an effective MOOC learning experience for learners with diverse backgrounds. The derived research findings are expected to assist MOOC instructors and platforms in constructing or redesigning MOOCs to accommodate learners' varied needs.

2 | LITERATURE REVIEW

This section first discusses the links of gender and employment status to varied MOOC learning outcomes, then reviews studies on motivation and continuance intention, the two critical psychological processes underpinning varied MOOC learning outcomes.

2.1 | The role of gender and employment status

Female learners were reported to behave differently from male learners in MOOCs. For example, Veletsianos et al. (2021) reported that women who completed MOOCs were more inconsistent in their learning time. Du et al. (2022) investigated 5,293 undergraduate students' spatio-temporal patterns when engaged in an online course. The study revealed that female students preferred to stay in a fixed or few learning locations. Shi et al. (2019) observed that females tended to post more comments in the discussion forum in a MOOC.

The findings on the learning achievement and MOOC completion across gender groups were inconsistent in the literature. Based on the data from over 67,000 learners in 20 MOOCs, Kizilcec and Halawa (2015) concluded that women were less likely to persist in the course or achieve higher scores than male learners. In contrast, Morris et al.'s (2015) and Shrader et al.'s (2016) studies did not support the association of gender with MOOC completion, though significant gender differences were reported in some courses in Morris et al.'s study (2015). These inconclusive findings might be partly attributed to pooling data from multiple MOOCs, which resulted in the lack of control on the moderating effect of course disciplines. For example, Kizilcec et al. (2017) found a gender gap in the completion

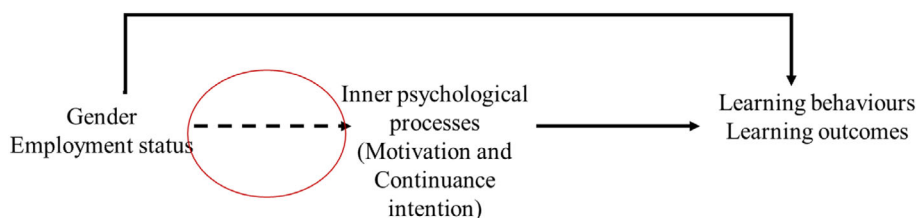


FIGURE 1 Literature gap. Solid lines indicate that available studies are supporting the associations, whereas the dashed line reveals the literature gap

rate favouring female learners in an English language learning MOOC, while male learners persisted longer than females in a Computer Science MOOC (Crues et al., 2018).

Regarding employment status, Morris et al. (2015) reported that employment status was significantly associated with learners' persistence in MOOCs, with unemployed learners being more likely to complete more content. Cisel's (2014) study also found that unemployed learners set a higher learning target and covered more content than students. Shrader et al.'s (2016) analysis of six MOOCs on Coursera revealed that employed, unemployed, and retired learners watched more lecture videos than students.

2.2 | Motivation

A study of motivation is pivotal for understanding learners' behaviours in an environment with a high level of autonomy such as MOOCs. Previous studies have presented different motivation types for MOOC learning. Zheng et al. (2015) extracted four types of motivations from the interview data: fulfilling current needs, preparing for the future, satisfying curiosity, and connecting with people. Chang et al. (2015) investigated undergraduates in Taiwan and found the top four reasons for using MOOCs were suggestions from instructors, habit, special project requirements, and the cultivation of professional skills. Milligan and Littlejohn (2017) identified nine types of motivation under two overarching categories: relevance to the topic and relevance to the course. Semenova (2020) adopted a deductive approach by using Ryan and Deci's (2000) typology of motivation.

Variations in motivation, including its types and strength, have been found to associate with different learning patterns and outcomes in MOOCs (Zheng et al., 2015). For example, Haniya and Paquette (2020) found that highly active learners were more often motivated by clear learning goals, such as enhancing professional skills and preparing for a future career, while learners with limited participation were more often motivated by the interest to gain general knowledge. Semenova (2020), investigating 10,187 learners in nine MOOCs, concluded that learners driven by their general interest and the intention of getting a certificate of completion were more likely to finish the course, whilst learners registered for access to the course materials were less likely to do so.

Semenova (2020) noticed that learners' motivation might be associated with demographic characteristics, and controlled learners' education, prior knowledge, gender, age, and online learning experience when analysing the effect of motivation on MOOC completion. However, the interactive relationship between learners' demographics and motivation remained unexplored in her study. The literature investigating the association between learners' gender and employment status with motivation is relatively thin. Crues et al.'s (2018) study suggested women and men had different reasons for taking a computer science MOOC, and the interaction of motivation types and gender influenced learners' persistence and forum participation. However, this study was initiated to use MOOCs to overcome the gender gap in computer

science. The gender difference in this study is not surprising and might not be readily applicable to MOOCs on other topics. Milligan and Littlejohn (2017) probed the differences between students and working professionals in two selected MOOCs. They found that students were mainly motivated to complement their formal learning and by the benefits to their future careers, while working professionals were primarily driven by the relevance of the course content to their current roles and the opportunities to explore new topics. However, their study selected two MOOCs focusing on "technical topics with little mass appeal" (p. 99). In addition, the data screening approach—retaining the first motivation as the primary motivation and discarding the additional reason(s)—might pose a potential bias in the results and limit the richness of the data to be analysed. Lastly, Watted and Barak (2018) have suggested that the differences regarding enrolment motivation and MOOC learning experiences might be related to learners' cultural backgrounds and geographical regions. None of these studies was contextualized in Chinese MOOCs.

2.3 | Continuance intention

As discussed in Section 2.1, learners' completion of MOOCs has been found to associate with gender and employment status in previous studies. Continuance intention is a valuable construct in the research on learning persistence/completion in MOOCs (Dai, Teo, Rappa, & Huang, 2020). Alemayehu and Chen (2021) reviewed 37 empirical studies on learners' engagement in MOOCs from 2014 to 2020. They recommended that researchers should continue to investigate learners' intention as it has been reported as one of the factors making "major contributions to the completion of MOOCs" (p.13). However, few researchers have examined whether the development of learners' continuance intention differs across groups defined by gender and employment.

In explaining the development of learners' continuance intention to learn in MOOCs, various studies (Alraimi et al., 2015; Dai, Teo, & Rappa, 2020; Dai, Teo, Rappa, & Huang, 2020; Zhou, 2017) have validated the three constructs—confirmation, satisfaction, and attitude—as important determinants for continuance intention, and empirically supported their inner relationships as depicted in Figure 2.

Satisfaction is an emotional response to the initial MOOC learning experience. Confirmation refers to the perceived congruence between learners' initial expectation and the actual learning experience. Attitude captures learners' affect toward the intended behaviour. This model is directly adopted here to represent part of the psychological processes influencing learners' continuance intention to learn in a MOOC. The current study aims to determine whether the underlying psychological processes (described by the model) of the varied learning outcomes operate differently across learner groups defined by employment status and gender.

In summary, despite the insight on the association between the two demographic characteristics and learners' behaviours and achievements derived from the extant studies, little has been done to characterize the interaction between the two demographic

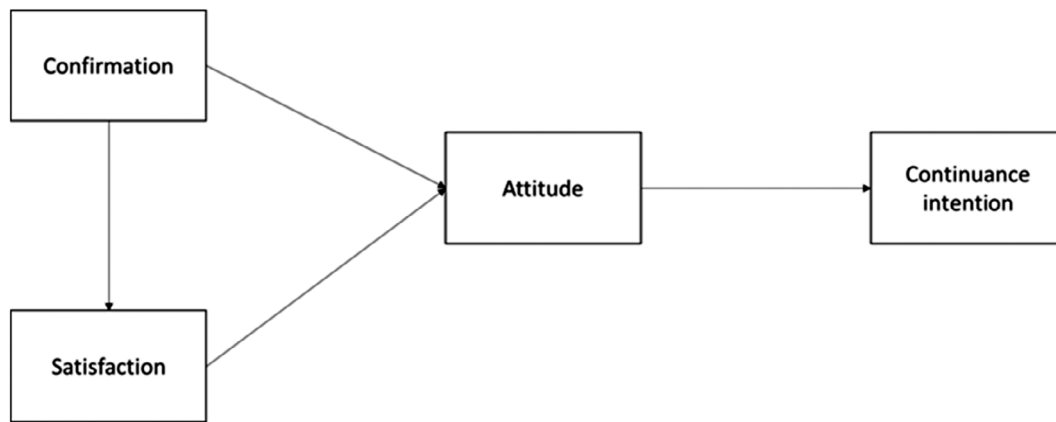


FIGURE 2 Continuance intention to learn in a massive open online course

factors and the psychological processes underpinning varied learning outcomes. Our study probes into this issue and focuses on learners' motivation and continuance intention in a *Chinese MOOC*. To minimize the bias, our study investigated the role of gender in a *specific MOOC* rather than multiple MOOCs and selected a MOOC with a discipline that was *not found to skew in favour of a specific gender*. Furthermore, the MOOC has chosen *appeals to a mass audience*. It can serve as a course for a liberal arts education or an introductory course on psychology for future or in-service professionals. Lastly, respondents were encouraged to list all their reasons for taking the MOOC, and *all reported reasons* were included in the data analysis.

3 | METHODS

3.1 | Procedure

A questionnaire survey was administered from October to November 2019 to learners from a Chinese MOOC. The questionnaire was uploaded to the MOOC's webpage to collect data of: (a) respondents' demographic information, (b) responses to an open-ended question "What motivated you to enrol in this MOOC?", and (c) ratings on 14 items to measure the four constructs: continuance intention, attitude, confirmation, and satisfaction. The measurement instruments were adapted from well-established scales identified in the literature (Bhattacharjee, 2001; Oliver, 1980; Yang & Yoo, 2004) (see Online Appendix A). The questionnaire had undergone the face and content validity test by two experts in the field of education and technology, and then a standard back-translation procedure (Brislin, 1970) by two language experts.

3.2 | Participants

In total, 664 respondents gave consent to use their data in this study. As the number of other employment types was too small in the dataset to produce sufficient power for statistical tests (one retiree,

three housewives, and eight did not specify), we only retained the data of students and working adults. After deleting 26 unengaged responses, 626 cases were retained. Students' ages were from 18 to 30 ($n = 307$; $M = 19.97$; $SD = 1.866$). Working adults were more varied in their ages, from 18 to 58 ($n = 319$; $M = 33.1972$; $SD = 8.328$).

3.3 | Data analysis

The qualitative data were analysed to address RQ1. Given the kind of data, short responses to the open-ended question, the following techniques were used to discover themes: repetition and recurrences, indigenous categories, similarities and differences, cutting and sorting, word-counting (Bernard et al., 2017). The first author identified 13 codes from the full dataset. A codebook, consisting of the definitions of these codes and their respective exemplary responses, was given to a research assistant to analyse the dataset of students. The intercoder agreement reached 77.67%. Differences between coders were resolved by re-examining the relationship between codes and refining the definitions of codes. The final codebook, including 12 themes with definitions and examples, was used to recode the entire dataset. The counts of each theme were recorded and compared across learner groups to determine whether there were significant differences across learner groups. Furthermore, responses under each theme were compared to identify nuances in learners' motivation across groups.

To address the RQ2, a two-step structural equation modelling (SEM) was employed to confirm the proposed model's validity in explaining the continuance intention. Thereafter, the equivalence of the structural model was assessed to determine whether the model of continuance intention was invariant across learner groups.

4 | RESULTS AND DISCUSSION

4.1 | Group differences in motivation

In total, 439 respondents provided answers (6,693 Chinese characters) to the open-ended question of motivation. In answering RQ1,

TABLE 1 Frequency of themes across groups

Theme	Students (n = 223)		Working adults (n = 216)	
	Number	Percentage	Number	Percentage
1	40	17.94	22	10.19
2	84	37.67	70	32.41
3	3	1.35	0	0.00
4	67	30.04	74	34.26
5	46	20.63	65	30.09
6	13	5.83	5	2.31
7	6	2.69	6	2.78
8	10	4.48	5	2.31
9	8	3.59	6	2.78
10	11	4.93	18	8.33
11	11	4.93	3	1.39
12	3	1.35	9	4.17
Theme	Male (n = 155)		Female (n = 284)	
	Number	Percentage	Number	Percentage
1	15	9.68	45	15.85
2	51	32.90	103	36.27
3	2	1.29	1	0.35
4	56	36.13	85	29.93
5	42	27.10	69	24.30
6	3	1.94	15	5.28
7	3	1.94	11	3.87
8	1	0.65	14	4.93
9	6	3.87	8	2.82
10	11	7.10	18	6.34
11	8	5.16	6	2.11
12	5	3.23	7	2.46

Note: The correspondence between the numbers and the themes are as follows: 1: Requirements of learners' affiliated institutions; 2: Interest; 3: Compensation for their failure in Gaokao (Chinese college entrance exam). Learners registered for this MOOC as a replacement for residential course which was impossible for them to access to because of their low scores in Gaokao; 4: Pursuit of knowledge; 5: Need for self-improvement; 6: Recommendation; 7: Instruction quality; 8: Typical features of MOOCs; 9: Lifestyle adjustment; 10: Addressing specific problems; 11: Preview, consolidation and supplementation of the classroom learning; 12: Quest for individual well-being. Percentages indicate the ratios of learners in that particular group referring to each theme.

12 themes were identified as learners' motivation to enrol in the MOOC (see Online Appendix B). The most salient themes for all learner groups were the requirements of learners' affiliated institutions, personal interest, the pursuit of knowledge, and the need for self-improvement. Other motivation types were less prevalent, each reported by less than 9% of each learner group (see Table 1). These findings are similar to those from Milligan and Littlejohn (2017). They found that most respondents reported four reasons motivating their participation in two MOOCs: general interest, the opportunities to learn about the topic (the theme of "pursuit of knowledge" in our

study), the relevance of the course topic to their current roles, and its relevance to future careers. The last two reasons have been subsumed under the theme of "need for self-improvement" in our study. Adding to their results, many respondents in our study referred to the requirements of affiliated institutions as their motivation. Chang et al. (2015) also found that undergraduates in Taiwan were required by their instructors to use MOOCs as a part of residential course engagement. In our study, the MOOC was directly integrated into the university system—students can take the MOOC for credits. This theme and the other three themes—preview, consolidation, and supplementation of the classroom learning; compensation for the failure in Gaokao (Chinese college entrance exam); and recommendation—depict a coexisting ecosystem integrating MOOCs and the formal education system in China. This finding is contrary to the early claim that MOOCs are a "disruptive innovation" to the higher education system (Yuan & Powell, 2013) and consistent with "a growing consensus that MOOCs will be integrated into existing higher education systems" (Littenberg-Tobias & Reich, 2020, p.1). Unlike the previous studies, we did not find learners registering for this MOOC for social reasons reported by Shi et al. (2020), nor for the certificate of completion by Semenova (2020).

These themes occurred in varying intensity. Table 1 presents the counts of each theme and their respective percentages in the responses of each learner group. The chi-square test on the counts of each theme between students and working adults indicated a significant difference [$\chi^2 = 27.279$ (df = 11, $p < 0.05$)], whereas no significant difference was found across gender [$\chi^2 = 18.850$ (df = 12, $p > 0.05$)]. A close examination of the differences between students and working adults indicated that these two learner groups not only differed quantitatively, but also varied in their expressions for each theme. The important differences between working adults and students are discussed in the following section.

Interest: Respondents indicated that they "like", "are interested in", or "are passionate about" psychology, and they wanted to "satisfy their curiosity." This theme was most salient in students' responses (84 students). Among them, 47 cited interest as the only reason for learning this MOOC. Though the frequency of its occurrence was noticeable in working adults' responses, it was not the most mentioned theme for this group.

Pursuit of knowledge: The most mentioned motivation for working adults is their "pursuit of knowledge." Seventy-four working adults referred to this theme, and 42 of them cited it as the only reason. Their motivations included acquiring general and subject-specific knowledge, extending the breadth of knowledge and exploring the depth of expertise in a particular domain. In addition, some strived to understand more about themselves—"to have a clear perception of myself", while some desired to "have another perspective to view the world" and understand "others' emotions."

Three differences were identified between students and working adults in this theme: (a) working adults added a temporal dimension to describe their act of pursuing knowledge—they believed that "there is no end to learning"; they felt that they were in a state of "[knowledge] output greater than input"; and they needed to "recharge" and

“continue learning”; (b) when seeking knowledge about “others”, working adults had an explicit reference. They wanted to know more about their students or children; (c) working adults had set standards of the knowledge they expected to learn from this MOOC—“learn something systematically instead of relying on WeChat official accounts¹ and short videos”; “I hope to learn something more scientific²....”

4.1.1 | Need for self-improvement

Students signed up for this MOOC to enhance their communication and interpersonal skills, promote competitiveness and ability, increase their value to society, and cultivate their “Xiu Yang” (The Confucian concept of self-cultivation: developing one’s capability and nurturing of one’s character). In contrast, working adults gave more weight to the development of their professional performance—“improve professionalism”, “serve teaching”, “understand clients’ needs.”

Respondents from both groups believed that learning in this MOOC could better prepare them for future careers—“a necessary training for being a teacher in the future” (student); “if that’s feasible, [I might] re-orientate my career to this domain. My ideal job is to be a psychological consultant” (working adult), or for further education “prepare for postgraduate entrance exam.”

4.1.2 | Lifestyle adjustment

Some students took this MOOC as a pastime, for mental relief, or as an adjustment to their daily routine—“Learning Chinese medicine is boring. I feel I am losing the fun [of learning]. Choosing [the MOOC of] Psychology is a change.” Working adults also reported using this MOOC to stave off boredom, but they emphasized that time spent in this MOOC was meaningful—“I don’t want to waste my time, so I find something meaningful for myself.” Zheng et al. (2015) similarly reported that whilst some participants in their study appropriated some MOOCs as edutainment, these participants did not intend to learn MOOCs “purely for entertainment” nor to invest substantial amounts of time and effort in “regular courses that are unrelated to work or study” (p.1888).

4.1.3 | Addressing specific problems

Some learned this MOOC to solve specific life or work issues, hoping to change their current dilemma. For example, students wanted to release their mental stress, change their personality, or adjust their current psychological state in learning or life. Working adults mentioned similar personal problems. They also wanted to address others’ issues, for example, teachers searched for strategies to help their students—“to analyse the problems my students experience in the learning process”, and parents looked for methods to support their children—“I can’t understand my adolescent child’s behaviours...

[I enrolled in this MOOC to] help my child to cope with the problems.”

4.1.4 | Requirements of learners’ affiliated institutions

Some learners attributed their learning in this MOOC to external requirements. Students enrolled in this MOOC because it was a compulsory or an elective course designated by their affiliated institutions—“[completion of this MOOC can] transfer to course credit”, or a supplementary learning material required by their classroom instructors—“it is required by the course of psychology.” Unlike Goglio and Bertolini’s (2021) finding that MOOC certificates lack acknowledgement as a training credential, 22 of the 93 participants who identified themselves as teachers responded that their schools required them to complete this MOOC. This theme revealed the various ways that the Chinese formal education system is using MOOCs to support classroom teaching and teachers’ professional development.

4.1.5 | Recommendation

Some learners were recommended this MOOC by others. For students, these influential others included their classmates, seniors in universities, teachers, and supervisors. In Chang et al.’s (2015) study, instructors’ suggestions were the most crucial reason to enrol in MOOCs for undergraduates in Taiwan. However, the current study found less than 6% of the students cited this theme. Working adults were influenced by their family and the virtual learning community, such as Zhihu (a question-and-answer website like Quora), course ratings, and reviews posted by other MOOC learners. Both learner groups mentioned course ratings and reviews. Course ratings and reviews, just like those for a typical online sale, are open to the public as a reference for course selection. A study on the influence of online ratings and reviews on hotel booking (Gavilan et al., 2018) revealed that web users trusted bad ratings regardless of the number of reviews, and good ratings were trustworthy only when a high number of reviews accompanied them. An important message from this marketing study is that MOOC construction is not a one-off event. Instructors need to regularly check the course ratings and reviews and update or revise MOOCs to satisfy learners’ needs.

Overall, a significant difference in motivation was found across learner groups defined by employment status but not across gender groups. More students were motivated by personal interest than working adults. In contrast, the latter cited more frequently the pursuit of knowledge, need for self-improvement, and a quest for individual well-being as their reasons for enrolment. In addition to this statistical difference across groups, a closer examination of these themes revealed that working adults tended to have more explicit goals/intentions for learning in this MOOC—to understand their children and students or to learn something scientifically proven in a

TABLE 2 Descriptive statistics and convergent validity

Constructs	Items	Mean	Standard deviation	Standardized factor loading ^a	CR	AVE	Cronbach's alpha
Confirmation	CON1	6.13	1.039	0.692	0.87	0.631	0.857
	CON2	5.58	1.356	0.625			
	CON3	6.27	0.907	0.901			
	CON4	6.31	0.893	0.918			
Continuance Intention	COI1	6.49	0.844	0.894	0.832	0.63	0.813
	COI2	6.37	0.93	0.872			
	COI3Re	6.575	0.798	0.575			
Attitude	ATT1	6.451	0.871	0.929	0.962	0.894	0.962
	ATT2	6.453	0.888	0.957			
	ATT3	6.440	0.898	0.951			
Satisfaction	SAT1	6.24	1.1	0.905	0.983	0.877	0.966
	SAT2	6.23	1.094	0.941			
	SAT3	6.21	1.089	0.951			
	SAT4	6.17	1.1	0.949			

^aFactor loadings are all significant at $p < 0.001$ level.

systematic manner; and added professional performance as another aspect they attempted to improve via learning this MOOC. A plausible reason for these differences might be that working adults, usually managing more life responsibilities, tend to be cautious about the productive use of their time. Therefore, the instrumental value of the course might be more critical for them. This explanation was corroborated by the theme “lifestyle adjustment” - similar to some students, working adults used the MOOC as a pastime. Still, they emphasized spending their spare time in this MOOC as an effective use of their time.

In practice, these group differences implied that additional features should be integrated into the MOOC to satisfy the expectations and needs of working adults. For example, instructors can (a) include relevant empirical research into the course to improve its *credibility*; (b) use visual aids to display the logical relationship of each lecture in the syllabus and guide working adults to learn *systematically*; (c) present the course content into easily digestible chunks and provide more summaries of key concepts to enhance learners' perception of *effective time use*; and (d) incorporate the discussion on the practical application of the core concepts and theories into lectures or quizzes to satisfy learners' needs to *promote their professional skills*.

4.2 | Group differences in the development of continuance intention

4.2.1 | Assessment of normality

To address the RQ2, a two-step SEM was first employed to test the proposed model's validity to explain continuance intention for the entire sample. The skewness values range from -2.412 to -0.691 and the kurtosis values from -0.296 to 7.619 , indicating no substantial departure from normality based on the thresholds recommended by Kline (2011) that these values should be below $|3|$ and $|8|$,

TABLE 3 Discriminant validity

	ATT	CON	COI	SAT
ATT	0.946			
CON	0.614	0.794		
COI	0.644	0.658	0.794	
SAT	0.608	0.529	0.546	0.937

Abbreviations: ATT, attitude; CON, confirmation; COI, continuance intention; SAT, satisfaction.

respectively. As SEM requires that data follow multivariate normal distribution, 14 data points were further deleted as multivariate outliers according to their Mahalanobis distances (Byrne, 2010), resulting in a sample size of 612 used in this test. After this, multivariate normality was supported by the observation that Mardia's coefficient (1970), 220.329, was below the computed result of 224 from the formula $p(p+2)$, p representing the number of observed variables (Raykov & Marcoulides, 2008).

4.2.2 | Measurement model

Values of composite reliability (CR), Cronbach's alpha, and average variance extracted (AVE) satisfied the recommended thresholds, $CR > 0.60$ (Hair et al., 2010), $Cronbach's\ alpha > 0.70$, and $AVE > 0.50$ (Fornell & Larcker, 1981), indicating the convergent validity of the measurement (see Table 2). On the other hand, discriminant validity was evidenced by the greater values of all constructs' square root of AVE over the values of constructs' correlations with other constructs (Fornell & Larcker, 1981) (see Table 3).

The comparison between the hypothesised measurement model and the sample data yielded a χ^2 value of 176.737 ($df = 70$; $p < 0.001$). The χ^2 value had been found to be sensitive to sample size (Hair et al., 2010); thus, other fit statistics were used to determine the

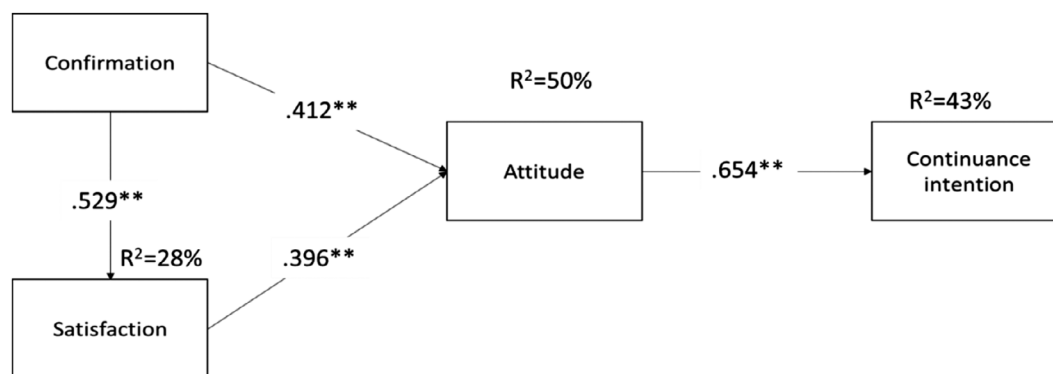


FIGURE 3 Structural model

adequacy of the model, including normed chi-square ($\chi^2/df = 2.525$), comparative fit index (CFI = 0.987) and Tucker Lewis Index (TLI = 0.984), standardized root mean square residual (SRMR = 0.0317), and root mean square error of approximation (RMSEA = 0.050 with 90% confidential interval of [0.041–0.059]). The values of all these fit indices suggested a psychometrically sound measurement model (see the cut-off values recommended by Hair et al. (2010) and Hu and Bentler (1999), $\chi^2/df < 5$, CFI > 0.90; TLI > 0.90; SRMR < 0.08; RMSEA < 0.08).

4.2.3 | Structural model

The values of the fit indices ($\chi^2/df = 3.812$, CFI = 0.976, TLI = 0.970, SRMR = 0.0317, RMSEA = 0.068 with 90% confidential interval of [0.059–0.076]) were indicative of a well-fitting model. All relationships between constructs were significant at $p < 0.001$ level. The proposed model explained 43% of the variance in continuance intention, 50% of attitude, and 28% of satisfaction (See Figure 3).

4.2.4 | Multigroup analysis (students versus working adults)

To test the structural model's invariance across students and working adults, the study adopted Byrne's (2010) model testing procedure. This procedure encompasses a series of hierarchical steps, entailing first establishing a baseline model, assessing the validity of the baseline model, followed by testing the equivalence of measurement and structural parameters across groups. During the process, parameters found group-invariant are cumulatively constrained equal for the subsequent tests.

This multigroup comparison procedure (see Online Appendix C for the detailed analysis procedure) revealed significant variance in two measurement parameters and two structural parameters across groups. The differences in the measurement parameters indicated that working adults placed more weight on the con1 (MOOC system quality) and con2 (Interaction quality) than students (working adults: $\beta_{CON-CON1} = 0.749$, $\beta_{CON-CON2} = 0.693$; student learners:

$\beta_{CON-CON1} = 0.662$, $\beta_{CON-CON2} = 0.617$) when evaluating their perception of confirmation. In addition, the significant differences in the two structural parameters revealed that, in determining their attitude toward MOOC continuance learning, *working adults* were more influenced by confirmation ($\beta_{CON-ATT} = 0.485$; $\beta_{SAT-ATT} = 0.3$), whereas *students* were more influenced by satisfaction ($\beta_{CON-ATT} = 0.275$; $\beta_{SAT-ATT} = 0.519$).

This result might be related to the differences in the enrolment motivation identified from the qualitative data. More students reported personal interest as the motivating factor, whereas many working adults cited their pursuit of knowledge, need for self-improvement, and a quest for individual well-being as motivation. In other words, students were more intrinsically motivated—"the doing of an activity for its inherent satisfaction rather than for some separable consequence" (Ryan & Deci, 2000, p. 56), while working adults were self-regulated but had clear expectation of the instrumental value of MOOC learning. Confirmation is the perceived congruence between individuals' expectations and the real learning experience; therefore, working adults' clear expectations of a MOOC at the enrolment stage would translate into their sensitivity to confirmation when deciding to continue learning in the MOOC.

4.2.5 | Multigroup analysis (males versus females)

The same procedure was applied in testing the structural model invariance between male and female learners. The structural model was valid across gender ($\chi^2/df = 2.727$, CFI = 0.969, TLI = 0.963, SRMR = 0.0794, RMSEA = 0.053 with 90% confidential interval of [0.047–0.059]). The test of the invariance of the measurement parameters indicated all factor loadings were invariant across gender [$\chi^2 = 3.944$ (df = 2, $p = 0.139$)]. The test of equality of structural parameters revealed significant differences in the regression paths [$\chi^2 = 38.222$ (df = 4, $p < 0.001$)]. The path-by-path labelling analysis identified three hypothesised relationships were unequal across gender: ATT → COI [$\chi^2 = 3.907$ (df = 1, $p = 0.048$)]; SAT → ATT [$\chi^2 = 36.806$ (df = 1, $p < 0.001$)]; CON → ATT [$\chi^2 = 13.502$ (df = 1, $p < 0.001$)]. The gender difference in the path of ATT → COI was

slightly significant with a marginal discrepancy (Female: $\beta_{ATT \rightarrow COI} = 0.653$; Male: $\beta_{ATT \rightarrow COI} = 0.66$). More salient differences were found in the path of $SAT \rightarrow ATT$, males were more influenced by satisfaction in determining their attitude toward MOOC learning (Female: $\beta_{SAT \rightarrow ATT} = 0.336$; Male: $\beta_{SAT \rightarrow ATT} = 0.673$); and the path of $CON \rightarrow ATT$, women depended more on confirmation in determining their attitude (Female: $\beta_{CON \rightarrow ATT} = 0.459$; Male: $\beta_{CON \rightarrow ATT} = 0.177$).

Studies on confirmation bias provide a potential explanation for this observed gender pattern. Confirmation bias is a widespread phenomenon of people seeking information consistent with their prior beliefs, attitudes, or preferences while neglecting the inconsistent information to reduce cognitive dissonance (Knobloch-Westerwick et al., 2015). Traut-Mattausch et al. (2011) conducted an experimental study and found that gender and decision types had an interaction effect on the confirmation bias. Their research discussed two decision types: independent decisions (decisions only affect the decision-makers) and interdependent decisions (decisions affect the decision-makers and specific others). MOOC learning is an independent decision under this classification. Their study revealed that females tend to be more confirmation-biased, that is, more sensitive to confirmation, in their decision-making processes when making independent decisions.

Another possible explanation is women's multiple roles in work and life. Tett (2001) described working-class adults' participation in higher education as a gendered journey. An interviewee in this study mentioned that she stopped studying because her husband did not like it and considered it as her neglecting him and their children when she was studying. In fact, women were reported to be more likely to withdraw because of the conflicts between their domestic and student roles in all types of education (McGivney, 2004). In evaluating the equity of a MOOC-based blended professional degree, Littenberg-Tobias and Reich (2020) discussed women's caregiving responsibilities as one of the filtering mechanisms affecting their abilities to complete the courses. We suspect that women, like working adults, are time- and effort strapped. Therefore, it would be more likely for them to alter their attitude when the learning experience does not confirm their initial expectations.

The results discussed above imply that it would be more critical to understand female learners' and working adults' expectations of MOOC learning, as they are more sensitive to confirmation in determining their attitudes toward learning in a MOOC. A short pre-course survey of learners' expectations would serve the purpose. Accordingly, adjustments on the course content, pedagogies and system design can be made to satisfy their expectations and reduce negative confirmation.

5 | CONCLUSION

The COVID-19 pandemic makes residential education challenging to implement. Meanwhile, the Fourth Industrial Revolution constantly demands new competencies and skills. Life-long learning has become a critical survival skill in the modern age. MOOCs represent a viable pathway to formal education and life-long professional training, which

also implies that MOOC learners are more diverse in their backgrounds, learning needs, and styles. This study explores the learning experience of different learner groups defined by gender and employment status as a first step toward promoting MOOCs' affordances of personalized learning. The research findings demonstrated significant differences in enrolment motivation and variant psychological processes underlying continuance intention across learners of different gender and employment status.

Overall, the research findings have extended the literature in the following aspects: firstly, whilst the major motivation types for MOOC enrolment identified in this study are largely similar to what the previous MOOC studies have reported, our study also found some motivation types specific to the culture and the course subject, for example, learning the MOOC to compensate for the failure in Gaokao; Secondly, previous studies assessing the strength of motivation usually adopted instruments developed in the context of classroom learning, for instance, Motivated Strategies for Learning Questionnaire (Pintrich et al., 1993). These instruments might not be suitable in a context with a diverse learner population with varying purposes for enrolling in a MOOC. The motivation types identified in this study can be used as the main dimensions to further develop the measurement instrument specific to the MOOC settings; Thirdly, the identified group differences in the motivation types inform researchers that MOOC learners' characteristics should be considered when discussing and measuring their motivation; Lastly, the current study contributes to the research line of MOOC continuance intention by revealing that gender and employment status are significant moderators when explaining or predicting continuance intention.

6 | LIMITATION

The interpretation of the research results should consider the following limitations: (a) the identified motivation types are not an exhaustive list, as the study only retained frequently mentioned themes; (b) the study only collected data from Chinese learners in a Chinese MOOC on psychology. Future studies can explore learners' psychological processes and behaviours in MOOCs of different topics or in different language and cultural contexts; (c) Many respondents provided multiple motivations for enrolling in this MOOC. Another line of research is to invite learners to rank the importance of their motivations and investigate whether the rankings of the motivation types are different across learner groups; (d) As the number of other employment types was too small in the dataset to produce sufficient power for statistical tests, they were eliminated from the study. If the research aims to personalize MOOC learning, researchers could recruit more learners within each demographic category and conduct multigroup comparisons in future research.

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CONFLICT OF INTEREST

There are no conflicts of interest arising from the study.

PEER REVIEW

The peer review history for this article is available at <https://publons.com/publon/10.1111/jcal.12681>.

DATA AVAILABILITY STATEMENT

The data in this project is not available publicly to meet the agreements with the MOOC instructor and the participants.

ETHICS STATEMENT

The data collection was conducted when the first author was at Murdoch University with approval by its Research Ethics and Integrity Office (Project No. 2019/158). The study followed all protocols required to research in an ethical manner.

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ENDNOTES

- ¹ WeChat official account is the equivalent of a Facebook page in China.
- ² The respondent used the phrase “科学的.” The English counterpart for it is “scientific”, which means something has been proved through a scientific procedure.

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SUPPORTING INFORMATION

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