ANALYSIS OF THE CHARACTERISTICS OF EMOTIONAL EXPERIENCE IN MOOC LEARNING

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ABSTRACT

With the rapid development of massive open online courses (MOOCs), researchers have begun to pay attention to the experience of teachers and students in the MOOC classroom. Select the middle school mathematics curriculum standard and textbook research course in the MOOC platform of Chinese universities and collect 66 self-reported data of instantaneous experience and long-term experience of 10 learners on the course learning within two weeks. Qualitative and quantitative analyses were carried out in 8 sub-dimensions, including device usage preferences and problems, and platform tool application. The purpose of the research is to investigate the learning experience of MOOC learning platform more comprehensively and deeply. The research results show that mobile learning has become the main way of MOOC learning. The appearance, education and economy of the tools displayed on the platform directly affect the learning experience of learners. Demonstration tools are highly dependent, but the frequency of application, types and functions of tools are limited, and there is a lack of awareness and application of tools that promote advanced learning, deep learning, and reflective learning; the overall emotional experience of learners is in a positive emotional state and shows a distinct group characteristic. The learning experience of MOOC is directly related to the appearance, education and economy of the display tools in the platform; Learners have diverse experience of platform communication and cooperation tools, and are highly dependent on learning content display tools in the platform; Learners' emotional experience is both positive and negative, but it is dominated by positive emotions and shows distinct group characteristics.

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INTRODUCTION

With the gradual advancement of education informatization, the application of learning platforms such as MOOCs in the field of education has become increasingly widespread and has become a hot topic of general concern in the current international community. Learners learn knowledge on the flexible and autonomous course organization platform and experience the emerging MOOCs. In this process, learners actively and course objects maintain the entire learning process through dynamic information input and output. Learners should have the highest right to evaluate their learning platform and environment (Wainwright S, 2011).

People use technology not only to complete externally given tasks, but also to have feelings and experiences in the process of completing tasks (Dermo J, 2009). It is particularly important for learners to participate in and engage in a high-quality learning experience. A good learning experience can lead to higher satisfaction, platform influence and competitiveness (Rodriguez MC, Ooms A & Montañez M, 2013).

The learning experience initially refers to the term user experience. User experience refers to the complete psychological experience of the product during the interaction between the user and the product. American scholars divide the user experience into five categories: sensory experience, emotional experience, thinking experience, action experience and association experience (Schmitt, 1999). The complexity and breadth of learning experience make it difficult for people to form a unified understanding of its concept. Learning experience originates from the student-centered idea advocated by many scholars in developed countries of Western higher education. Existing studies have also defined learning experience. rather broad. Prosser and Trigwell believe that learning experience refers to students' perception and experience of the situation in the teaching environment, and it is the result of the interaction between students and their situation. Parrish et al. proposed that the learning experience is a unique personal feeling caused by the continuous interaction and co-creation of the learner and the environment (Parrish, Wilson & Dunlap, 2011). Since then, many conceptual models and measurement frameworks have been proposed. In general, most studies related to learning experience do not interpret and define specific concepts, but a general understanding and interpretation. The learning experience oriented to information-based educational products can be regarded as the use of a certain educational product. At the same time, learners' perceptions and perceptions of learning activities, behaviors, results, and learning. Learners are the main stakeholders in teaching, and teaching must pay attention to and study the needs of learners and their satisfaction.

The learning experience of the use of information technology tools in MOOC learning is the personal feelings and cognition's generated by the learners in the process of interacting with the learning environment when they use the information technology tools for learning. The MOOC learning environment related to teaching and society is not simply the design and use of online courses, tools or platforms, it relies on the interaction of specific situations, and generates personal subjective dynamic physiological, cognitive, emotional feelings and feelings in the interaction process. Learning experience refers to the subjective feelings produced by learners when they experience the learning process, and has the characteristics of individuality, dynamics, complexity and interaction. Learning experience includes not only the experience process and learning results in the dimension of personal experience, but also the experiential communication and value judgment in the dimension of social interaction. Learning experience is not only a momentary feeling state, but also a dynamic experience process. It is not simply equivalent to cognitive experience, but also includes experience content in multiple dimensions such as emotion, operation and value. Learning experience is a multi-dimensional and complex abstract structure, which is difficult to define and measure. More and more researchers pay attention to the learning experience of learning platforms such as MOOCs and conduct theoretical and practical explorations. However, from the perspective of learners, MOOC learning experience has not been fully studied, limited to the level of ethnography and narrative research methods, lack of empirical research based on courses and platforms, and the depth and breadth of research are insufficient.

The experience gained by learners interacting on the MOOC platform is one of the important factors in course evaluation (Mazzarol T, Soutar G N & Thein V, 2001). Taking technology as a learning tool, the application of information technology tools in learning can be divided into six functions: information, efficacy, situation, communication, cognition and

evaluation. According to these six functions, the information technology tools of MOOC learning mainly involve information presentation. Tools, collaborative communication tools and cognitive processing tools, these three types of tools are divided into two dimensions: MOOC course platform tools (content display tools and communication and collaboration tools) and learner personalization tools. Combined with the characteristics of MOOC platforms in Chinese universities, content display tools refer to a variety of media tools used to present course content, communication and collaboration tools are multiple course discussion areas for communication and collaboration, and personalized learning tools refer to a variety of information acquisition, processing, storage, communication, and management tools unique to learners that support their personalized learning.

Based on the above positioning, this research focuses on the learning experience of using these information technology tools in MOOC learning. From the perspective of learners, through the combination of qualitative and quantitative methods, subjective and objective methods, to more comprehensively and in-depth study MOOCs, etc. The learning experience of the learning platform, specifically analyze the countermeasures to enrich the MOOC learning experience, obtain more accurate and valuable evaluation results, and provide reference and suggestions for MOOC designers to build a more humanized platform. The specific research questions involve:

- What is the learning experience of learners using online teaching equipment, course platform tools and personalized learning tools?

- What tendencies and changes of behaviors and feelings do learners show in long-term learning?

- Are there group characteristics in the learning experience of learners?

METHOD

The research method is empirical sampling. Most of the traditional data collection uses the self-report test. The subjects fill in the pre-test and post-test to obtain the social and psychological state of the individual. However, there is a problem. Learning is a continuous process, and the traditional self-report test tests. It is generally the start and end state of learning, with a certain degree of lag and delay, and the empirical sampling method can make up for this defect. The empirical sampling method is also known as the diary method, the ecological instantaneous assessment method and the daily reproduction method, etc., which originates from the fields of psychology and behavioral science, a method of collecting real-time responses such as subjects real behaviors, feelings, and emotions when an event occurs (Reis & Gable, 2000). It has high validity and small deviation between recall and response (Bolger & Laurenceau, 2013), which is the best way to understand learning behavior (Weiss & Rupp, 2011), but it also has limitations such as time-consuming, heavy tasks for participants, and large amount of data (Wang & Heyns, 2011) Sampling methods can be divided into time sampling, event sampling and mixed sampling. The study interval is 7 to 30 days, usually lasting 1 to 2 weeks, and most studies require daily data collection. The researchers recruited 54 learners through questionnaires in the middle school mathematics curriculum standards and textbook research courses on the MOOC platform of Chinese universities that they participated in teaching and set the data collection period to two weeks from November 1 to 15, 2021. A total of 10 participants reported data continuously over a two-week period, in line with the researchers' suggestion that a minimum of 7 participants in the ESM (Gable, et al., 2000) and 5-10 participants can generate enrichment data (Hektner, et al., 2007).

The learning experience is a multi-dimensional structure, and its conceptual definition and classification are nuanced in different studies. But in general, three first-level dimensions (tool use, learning activity engagement, emotional feelings) and eight second-level dimensions (hardware device usage preferences and problems, platform tool application, discussion forum interaction, and personalized learning tool use) can be identified. , the basic situation of single learning, specific learning activities and feelings, overall emotional state, reasons for ending learning and emotional state), combined with domestic and foreign technology acceptance and user experience related scales, this study independently designed a learning experience report based on the MOOC platform , lists 19 questions related to the willingness, behavior, and emotion of using information technology tools in the course learning process to obtain quantitative and qualitative data on learning experience in real situations.
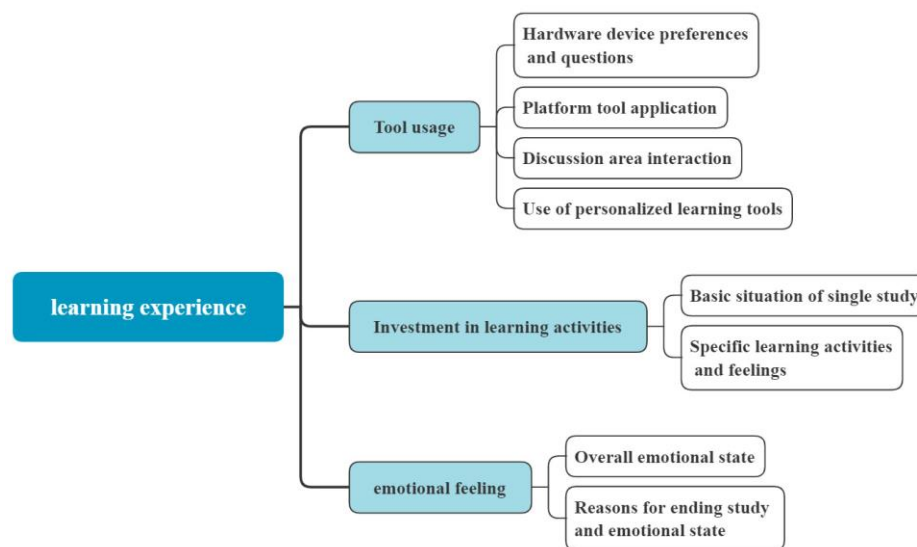

Figure 1. Learning experience analysis dimensions

To ensure the validity of the survey samples and the scientific of the research, the reliability and convergent validity of the questionnaires were analyzed first. The data of the empirical sampling method has the characteristics of dynamic and repeatability and has its own uniqueness in the reliability and validity test. The Cronbach's alpha coefficient of each dimension of the questionnaire is above 0.6, indicating that the questionnaire design of this study has good reliability. Convergent validity is used to measure whether each measurement index can reflect the same latent variable. It can be seen from Table 1 that the factor loading value of each item is basically above 0.6, only the QG3 value of the item is 0.59, so it is considered that the item loading value basically meets the requirements; the combined reliability of each measurement index of the questionnaire is greater than 0.6, which meets the requirements. AVE is between 0.36 and 0.5 as an acceptable threshold, and above 0.5 is an ideal standard. In the questionnaire, the AVEs of sensory experience, ease of use and usefulness were all above 0.45, and the AVEs of interactive experience, emotional experience and continuous use intention were all above 0.5. In conclusion, the questionnaire of this study has good reliability and convergent validity. Based on the learners' single online learning, the researcher adopts the event sampling method, reminds the participants regularly, and asks to send text, audio or picture reports through the mobile phone immediately after each learning, so as to obtain dynamic real-time, contextualized, and process information multiple times. For sensitive data, a total of 66 learning experience reports were obtained (as shown in Table 1).

Table 1. Learner basic information sheet

Students code	Profession	Grade	Feedback times	Learning equipment
S1	Biology course	Grade 9	5	Public computer
S2	Mathematics Subject	Grade 9	9	PC/mobile
S3	Physics course	Grade 9	8	Public computer
S4	Chemistry course	Grade 9	4	PC/mobile
S5	Geography course	Grade 8	4	PC/mobile
S6	Language course	Grade 8	6	PC/mobile
S7	Political course	Grade 9	3	PC/mobile
T1	Mathematics teacher	16 years	10	PC
T2	Physics teacher	12 years	9	PC
T3	Language teacher	5 years	8	PC/Mobile

arch group discussed together the content of the learning experience report and the 19 items in the outline, and then manually coded the sentence as the analysis unit. Disagreement of opinions will be resolved through consultation. Since the experience report is basically written according to the content of the outline, it is different from the diary or short article with a wide range of content. The coding difficulty is relatively small, it is easy to ensure consistency, and it is convenient for subsequent basic quantitative statistical analysis and qualitative analysis of classification and summary.

RESULTS AND DISCUSSION

Instant Experience Sampling Analysis

1) Hardware device experience analysis

The 10 learners surveyed are influenced by their majors and work environment, and they have preferences for the choice of hardware equipment and learning methods. Among the 66 learning experience reports, 32 involve the use of laptops or desktop computers for online learning, and 34 involve the use of smart phones for mobile learning. Mobile learning has become a common MOOC learning method. The learner described the device and network usage as having no special feelings. The two participants described their experience of using the device and the network in detail. S1 used the public desktop computer in the library's electronic reading room for online learning every time and encountered problems such as limited use of the device, slow loading, and flashback. It described the phenomenon that the viewing records of the APP computer terminal and the mobile terminal of the Chinese university platform are not synchronized, and the response time is long, resulting in the feeling of cumbersome learning by S4 in the third report. The special circumstances of equipment and network use take up extra learning time, destroy the learners' expectations for the convenience and efficiency of MOOC learning, easily reduce learning interest, cause irritability, and affect the subsequent learning status. Castaneda J At et al. (2007) found that negative key events were the fundamental determinants of users' continued intention to use online learning. Evanschitzky and Wun-derlich (2006) also found that negative key event

repair had a strong and positive moderating effect on affectivity and loyalty relationships. Although the problem of hardware use is not a common problem in MOOC learning, it is a basic problem. It is the foundation of the advantages of MOOC learning being open and not limited by time and space to obtain high-quality learning resources. The primary factor in the learning experience. Therefore, whether it is platform designers and developers, course designers and educators, or even learners themselves, designers need to do better design on the hardware devices of the platform, and at the same time, in terms of the richness and diversification of resources continuously improve and integrate more high-quality resources.

2) Platform tool usage experience analysis

This research adopts qualitative research method, mainly by analyzing the online logs written by students and the replies of teachers and students to analyze the process, gains and possible problems of learners' experience of MOOC and online classroom. Qualitative analysis of the content of the MOOC learning experience report found that the appearance, content and economy of the learning content display tool will affect the learning experience of learners to varying degrees.

In terms of appearance, learners are more concerned with audio comfort and video clarity. Improving the aesthetic experience of the interface can arouse the interest and attention of the learners, thereby improving the learning motivation. The difference between the two learning experience reports of S2 is the experience of appearance. In the second experience report, S2 specifically mentioned that the interface during learning is simple and elegant, clear and organized, and attachments can be downloaded, which is very beautifully designed. In the third report, it was pointed out that the sixth video in the second chapter was not smooth and the sound quality was not good enough to be played at double speed. It can be seen that whether the audio is comfortable or not and whether the video picture is clear or not directly affects the learning process and progress, and seriously affects the learning effect.

In terms of content, learners mainly focus on the practicality and innovation of the content. When T3 studied the plug-in operation content of the courseware in Chapter 5, he felt that this course was very practical, and he was very happy to be able to learn the knowledge of guiding teaching. S4 found in the 4th study report that novel situation creation can improve the teaching effect and wanted to learn the method of situation creation in the classroom. S6 wrote in the 6th study report that the content of these courses is generally new and interesting, and the single session is not long, so it is easy to follow. From these expressions, it can be seen that learners pay attention to their expected and current benefits and have high evaluations of course resources that can not only help them deepen their understanding of mathematics courses, but also promote the improvement of information technology teaching ability.

From an economical point of view, learners determine how and when to learn according to the type of content resource. For video learning, in-service teachers give priority to the time factor, and tend to use the campus network or personal devices to study online in their spare time; students in school consider its convenience. Choose to study online using a personal device. For the PPT courseware corresponding to the video content, learners usually choose to download it first and then browse it, on the one hand to consider its economy, on the other hand, it is also to retain the data for easy review. Although the network connection restricts learners to use any device to conduct extensive learning anytime, anywhere, but the learners' learning behavior and feelings on the use of MOOC platform content display tools have not had a substantial negative impact.

The study also found that although an important tool for learners to interact with teachers and classmates is communication and collaboration tools, learners do not use them frequently.

Although 29 learning experience reports mentioned participating in discussions, only 8 were more specific. Interaction behaviors and feelings are described, showing a polarized situation. Most learners just watch the posts quietly, watch the questions (or answers given) by other students, and do not seriously participate in the discussion. S1 gave feedback to the course group, read and participated in the discussion on the topic of multimedia courseware production methods, expressing that he felt that he had learned a lot from the opinions and ideas of others, which was very meaningful. S3 mentioned in the 4th report that it was worried that the score would be very low if not discussing, and that the discussion area interaction was based on the consideration of course performance. T2, because he felt that there were too many posts, could not be read, and everyone discussed it casually, and it was meaningless. He didn't want to spend too much time, just browsed but did not post or reply. In his report, he expressed his concerns about the grading standard of the course interaction module. What is rare is that S5 expressed its doubts on the issue of mutual assessment of homework. Although the content of the learning experience report used by the platform communication and collaboration tools was not much, several participants showed several different interactive learning behaviors and feelings. answer), did not participate in the discussion, thinking that the discussion was of little significance. Some were passive, and just responded to the discussion because of the course requirements. Some encountered problems in the study, but only expressed their personal feelings, and it is difficult to provoke discussion in terms of expression, more inclined to autonomous learning. Some show higher enthusiasm and willingness to interact and can actively discuss learning issues.

3) Personalized tool usage experience analysis

MOOC learning is different from traditional classroom learning. Learners need to independently build a personalized tool system that effectively supports MOOC learning. However, the reality is that learners still have many limitations in the application of personalized tools. Baidu search is the most frequently mentioned personalization tool. It belongs to the same information acquisition tool as CNKI. Cameras, screenshot and sticky notes belong to information recording and storage tools, as well as pen and paper notes and textbooks. These are common in traditional learning methods. Information presentation and recording tools, while some popular knowledge management tools such as mind mapping tools, cloud notes and time management do not appear in the participant toolbox. Judging from the frequency of use of personalized tools, learners have limited understanding of personalized learning tools that can effectively support their online and mobile learning, sharing and decision-making personal knowledge management tool system.

Table 1. Learner basic information sheet

Source name	frequency
Baidu search	43
CNKI	35
Phone camera	36
Mobile phone screenshot	34
Mobile phone note	24
Pen and paper notes	28
Textbook	22

4) Long-term experience sampling analysis

The individual long-term learning experience is the learning behavior and feeling of the learner in a long learning period. In order to help researchers to examine the individual long-term learning experience longitudinally and dynamically, it can be analyzed from three aspects, namely, the learner's single learning time, study period distribution and affective tendencies.
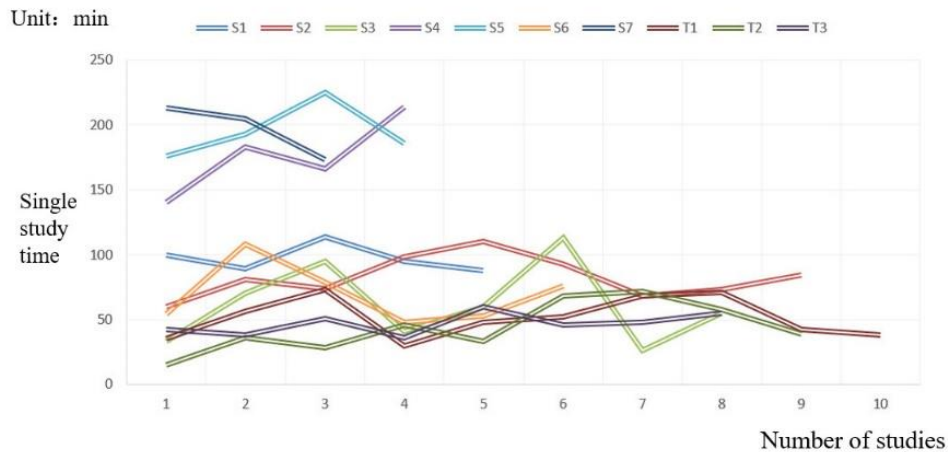

Figure 2. Learner's long-term single learning time change chart

Learning time series analysis

The learning time sequence of learners in the experimental period is shown in Figure 1, which intuitively shows the phenomenon that a single learning time is short when the number of learning times is large, and a single learning time is long when the number of learning times is small. Combined with the specific description of the reasons for single learning and the learning status in the learning experience report, it can be found that S1 has a longer single learning time, and the long-term concentrated learning is due to the approaching deadline for submitting assignments. S5 and S6 have a single learning time of 1~2 hours, and they are used to learning one section of content at a time. S3 has a heavy coursework and irregular spare time, so the single learning time varies greatly. Although S4, S5 and S7 try to focus on learning when the course releases new content, they will do other things while learning because the course content is boring, resulting in a single learning time of 2~4 hours. Compared with the other students, the three in-service teachers T1, T2 and T3 do not have longer free time for MOOC learning, so they tend to conduct fragmented learning and their learning is more dispersed. Part of the reason why learners end a session is because they have completed a single session or a single week of learning tasks, and partly because they are actively or passively withdrawing due to time constraints. Combined with the learning experience report, it is found that MOOC learning is difficult to take into account the individual needs of learners, and lacks pre-test and process incentives for learners.

From the learning time series of learners, the group characteristics are also more obvious, and the concentration of learning time of school students is significantly higher than that of in-service teachers. From an objective point of view, the reason is that students in school have more and flexible extra-curricular time, and can carry out concentrated and continuous course study, while in-service teachers have fixed working hours and limited leisure time, making it difficult for long-term continuous learning. The subjective reason may be that students in school study more courses for the purpose of obtaining credits. In order to be able to concentrate passive learning for a long time before the deadline, there may also be further lengthening of the study time due to inattention. In-service teachers are more motivated by the

need for personal professional development to learn MOOCs, and they have a strong thirst for knowledge. For example, T1 makes it clear that the reason for learning is that the knowledge is useful and helpful for work. In-service teachers have clear goals and flexibly conduct fragmented learning to complete learning tasks on time.

Time allocation experience analysis

The learning time allocation of learners is scattered, but the choice of individual learning time period is distinct and closely related to the individual learning and living situation. S1 regularly uses the public computer in the laboratory to study, mainly during the lunch break. The three in-service teachers of T1, T2 and T3 also have relatively stable study periods, mainly at noon and evening, with occasional exceptions due to objective reasons. S4 has a relatively fixed learning period due to more free time, and the learning period is distributed in the morning. S2 and S3 study periods are scattered in multiple periods after class or in the evening. According to the distribution of learning time, it can be divided into two different small groups, namely relatively fixed and relatively scattered, which are consistent with the small groups corresponding to the long and short individual learning time series, which also shows that there is a certain connection between the two. Learners with a relatively fixed learning period tend to have fragmented learning with a short single learning period and a large number of learning times, while learners with a more dispersed learning period tend to focus on centralized learning with a longer single learning period and fewer learning times.

Analysis of learning experience based on emotional Tendency

The ROST Emotion Analysis Tool uses positive or negative values to represent positive or negative emotional tendencies, respectively. This sentiment analysis tool builds a sentiment dictionary to count the number of positive and negative sentiment words in the text, determines sentiment polarity based on the difference, and divides it into three intensities: mild, moderate, and high, with a weight ratio of 1:1:1 , and then get the proportion of positive, negative and neutral emotions in the text. Sentiment analysis is carried out on the learners' learning experience reports respectively, and Table 3 can be obtained.

Table 2. Individual learner affective tendency data sheet

Students code	Positive emotion %	Negative emotion %	Neutral mood（%）
S1	45.61%	3.75%	50.65%
S2	27.11%	16.03%	43.14%
S3	32.43%	6.28%	61.29%
S4	42.13%	8.72%	49.15%
S5	34.91%	7.68%	57.41%
S6	42.61%	9.84%	47.55%
S7	28.46%	11.05%	60.49%
T1	40.28%	11.71%	48.01%
T2	25.56%	14.18%	60.26%
T3	28.15%	12.63%	59.22%

Judging from the learning experience report, the content of the learner's experience report is mainly the expression of neutral emotion, followed by the expression of positive emotion, and finally the expression of negative emotion. The emotional expression of students at school is rich, both positive and negative, and the positive emotions are concentrated in a medium level, which is mainly related to the study time arrangement. Among them, S1 mainly has negative emotions in the 2nd, 3rd, and 5th experience reports, involving learning tasks such as course discussion and homework and other course activities. S2, S5 and S6 mainly expressed the negative emotions related to the online learning platform in the 1st and 2nd experience reports, involving audio quality and video fluency issues, especially the positive emotions of the three participants in S3, S4 and S7. High, mainly concentrated in the moderate and high levels, indicating that they had more positive experiences. The negative emotions of the three in-service teachers T1, T2, and T3 are relatively small in number and degree. Negative emotions generally appear in the first two reports, which are mainly related to the low efficiency of the hardware environment network and online learning. The reason for this phenomenon is related to the fact that the experience report pays more attention to the factual statement than the emotional expression, and it is also related to the recognition of the current teaching content of the course by the in-service teachers.

The analysis found that most of the expressions of positive emotions appeared at the end of the experience report. According to the requirements of the writing syllabus, the learners were required to describe the reasons and feelings for the end of a single study. Therefore, the positive emotions of the learners were mainly related to the quality of the course content and the sense of achievement in learning, such as learning courses. It is very meaningful, and we have learned a lot of knowledge. This way of learning is very good. The teacher can present the knowledge to the students well, and the students can also adjust the learning progress according to their own learning situation and so on.

CONCLUSION

1．Research conclusions

The study found that learners have certain preferences for the selection of hardware devices in MOOC learning. Mobile learning has become a common learning method. The use of devices, networks and programs by learners will only be reported in special circumstances. The appearance, educational and economical aspects of the learning content presentation tools in the platform influence the learning experience. Learners are more sensitive to video clarity and audio comfort and will selectively allocate learning methods and time based on resource types. Learners acquire and organize knowledge in a single way and are highly dependent on platform content display tools. They do not use platform communication and collaboration tools frequently, have diverse attitudes, tend to study independently, and do not have a deep understanding of the necessity and advantages of collaborative communication in MOOC learning. The learners do not know much about the personalized information technology tools that can effectively support MOOC learning, the frequency, types and functions of their applications are limited, and they lack the knowledge and understanding of the information technology tool system that promotes efficient learning, deep learning, self-management and reflective learning. application.

The results of sentiment analysis show that the overall mood of individual learners is in a positive state, and they show certain mood fluctuations during multiple learning processes. Among them, students in school have relatively rich emotional expressions; in-service teachers have a high degree of positive emotions in this MOOC as a whole. Have more positive experiences. The learners showed certain group characteristics in the multiple learning behaviors in the experimental period. There is a corresponding relationship between

class learners, that is, learners with relatively fixed learning periods tend to have fragmented learning with shorter single learning periods and more learning times, while learners with more flexible learning periods tend to have longer single learning periods and more learning times. Focused learning with fewer repetitions.

2. Research recommendations

With the increasing informatization and digitization of society, MOOC learning will gradually become normalized. In this context, to optimize learning content, methods and corresponding management, improve learners' emotional experience and inner feelings in the process of using information technology tools. This paper mainly conducts research from the perspective of learners and puts forward some suggestions for MOOC platforms and personalized learning tools from three perspectives: the construction of digital teaching resources, the application of communication and collaboration tools, the digital learning environment, and the guidance of learning strategies.

From the research results, as an important MOOC platform display tool, the content and form of digital course resources have become the direct influencing factors of course quality, and indirectly affect the learning experience of learners. It is particularly important and urgent to improve the technical standards and content standards of course resources, and guide the construction of high-quality, cross-platform, multi-terminal, strong interaction, and easy-to-expand course resources. In appearance, digital teaching resources need to be able to maintain good visual and auditory effects to avoid negative emotions caused by noise and unclear picture quality to learners. In terms of content quality, digital teaching resources need to increase the interesting elements of the course based on ensuring the saturation and scientific nature of the course, so as to meet the motivation and emotional characteristics of learners, make learners feel novel and unique, and attract them to maintain continuous Enthusiasm for learning and commitment to learning, and ultimately achieve a good learning effect. To promote learners' active communication and collaboration, guide and continuously stimulate learners to participate in meaningful interactive learning activities (such as group discussions, collaborative work, etc.) Improve interest tags, push and other functions to increase the utilization and viscosity of platform tools; secondly, it is necessary to design practical collaborative learning activities and tasks, and to design collaborative learning tasks, interaction strategies, environment, resources, evaluation and other activities as a whole to promote learning Students deeply agree with the necessity and advantages of communication and collaboration; finally, it is necessary to integrate general social software outside the course platform, such as Weibo, instant messaging software (QQ, WeChat, etc.), live broadcast platforms, etc. Network, establish in-depth and lasting multi-dimensional connections among learners, and promote flexible and diverse exchanges and collaboration.

Learning MOOC courses is only the first step in the deep integration of information technology and courses. How to use information technology to help learners conduct efficient MOOC learning is the next challenge. Although this attempt has also shown us a broad space for the application of experience sampling in the field of learning analysis, there are also some inherent limitations, which are mainly brought about by the use of emerging methods, such as high requirements for learner cooperation and scale of data collection. However, in the face of the massive, diverse and heterogeneous learning data analysis needs in the era of big data, researchers can improve the research design and make the empirical sampling method a backup for data-intensive learning analysis research. Select tools, conduct triangulation with various methods, record and analyze three-dimensional and dynamic real learning situations. In order to improve the internal validity of the study, the sampling period was flexibly selected and adjusted to ensure that the sampling method matched the specific situation, and the subjects could answer timely and accurately. It is worth mentioning that there is still a lot

of research in online learning. Therefore, the characteristics of learners' MOOC learning and the promotion of the organic integration of MOOC learning and offline learning still need to be further studied in the future.

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