

Research on the Impact of Learning Feedback on the Engagement in the Context of Self-directed Learning Platform

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Abstract: With the the comprehensive application of new education technologies, the impact of learning feedback on the engagement based on self-directed learning platform is an important topic for further discussing. This paper attempts to use a combination of quantitative and qualitative methods to measure 50 students who participated in the German self-directed learning platform, in order to analyze the impact of learning feedback on the engagement in this context. The results showed that it needs to be improved for the participation of students in the online self-directed learning platform, and more students who only follow with interest or meet the needs of evaluation. According to the feedback behaviours, as an essential factor for the in-depth development of online learning, the result feedback is more helpful to enhance the engagement of students in online learning; the motivation feedback through the entire online learning process is the driving factor for students to participate in online learning; optimizing learning feedback strategies and improving students' self-regulation abilities are two main elements for constant online learning.

1. Introduction

With the development of information technology, computer networks are increasingly applied to the teaching models. Through the autonomous learning model, various new educational technologies are realized, which has completed the transition from traditional teaching to digital learning. The concept of "self-directed learning" was proposed by linguist Henri Holec in the early 1980s. He summarized it as "the ability to take charge of one's own learning" in the book "Autonomy and Foreign Language Learning". It is comprised by five steps: the first step is to develop learning targets; secondly, learning progress and concrete learning contents will be planed; thirdly, a matching learning skill and method will be chosen; the fourth step is to monitor the learning process; and finally, learning outcomes should be effectively evaluated [1]. Compared with the traditional teaching mode, self-directed learning focuses on autonomy and attempts to give full play to the role of students' self-consciousness and improving students' self-management ability and learning independence. As a carrier of students' self-directed learning, the resources and tools on the online self-directed learning platform could provide support for students' pre- and post-class learning. At the same time, it can not only record the learning traces and processes of students, but also help teachers to supervise the students' learning process and to master their learning status. However, some surveys showed that due to the lack of effective supervision, there are still many problems in the use of the self-directed learning platform. For example, the dropout rate of online courses is much higher than that of classroom courses. The persistence and efficiency of students' engagement in the online self-directed learning platform are not satisfying. On the one hand, it is difficult for students to be concentrated in the learning process; on the other hand students are less concerned about their learning outcomes and lack of initiative and thirst for knowledge, even if the students who persist are only for the attendance rate [2]. Therefore, how to enhance the learning interest and the learning effect to participate in the online self-directed learning platform, as well as how to maintain a continuous learning state are important themes to be further discussed in higher education.

Engagement is a core concept in the process evaluation of higher education quality. The engagement was defined by American scholar Astin as the physical and psychological strength of

students' actual input in learning activities, mainly including the degree of students' thinking, the learning initiative and the in-depth discussion during the curriculum. The engagement is affected by many aspects, such as difficulty level of contents, learning style, campus environment and interaction between teachers and students[3]. Zhao Limin proposed that engagement referred to the actual participation of students in teaching activities, which take the teacher guidance as the premise, so that students can reach the whole process of subject construction and rapid development[4]. Hu Min considered the basic concept of online learning engagement as the engagement through the self-directed online learning platform, which consists of cognitive engagement, behavioral engagement and emotional engagement [5].

In recent years, domestic and foreign scholars have relatively concentrated on the research of affecting factors of the engagement in online learning platform from the perspective of learning motivation. For example, Stephenson started from two aspects, which are the improvement of learners' interest and that of course value, and then can give full play to students' potential learning motivation and deepen the engagement in the curricula[6]. Gao Jie studied the impact of learning emotions and external learning motivations on the online learning input[7]. In the "motivation - participation" model proposed by Andrew Martin, it is clearly shown that motivation is related to a set of potential values. In the actual learning process, individual thoughts and behaviors have a direct impact on learning adaptability, and through in-depth interpretation of the curriculum value, learners will get a good course experience and improve their enthusiasm, so that learners are enable to maintain a better adaptive learning state[8]. Hatti also pointed out that the purpose of feedback is to help students finding out the gap between their learning targets and the actual learning state, and which should be further remedied. The most critical part of the student's learning process is feedback, which is also the main way for the learner to correct the knowledge components[9]. Mulliner indicated that engagement will gradually decrease over time, and feedback and self-regulation can improve the continuity of learning participation[10]. Moreover, Harks and other scholars also empirically researched the impact of feedback on interest, self-efficacy and achievement, and then drew the effect between process synchronization and target conclusive feedback, the former is much higher than the latter[11]. In addition, based on the ARCS model, Xu Rong and Li Luyi focused on the correlation between teacher guidance stimulation and learners. They fingered out that teacher guidance can make online learners more capable and full of confidence for the future testing. Students will achieve higher satisfaction and get more initiative and relevance related to learning contents by online learning, so that they can participate more in online learning[12]. By analyzing above literatures, it can be concluded that there are not much researches on the engagement based on the online self-directed learning platform from the perspective of learning feedback. Feedback comes from cybernetics. In the field of psychology, feedback is a kind of information that can transfer the "results" of learning behavior[13]. Learning feedback is the core part in the matrix, and also the key in all learning forms. In particular, it is necessary to follow up the feedback on the online self-directed learning platform to ensure a better implementation of the learning progress. Therefore, current researches concentrate on some topics, such as the relationship between engagement of online self-directed learning and its learning feedback, the actual affect of learning feedback on the online self-directed learning participation, etc.. This paper analyzes the empirical data by using the combination of quantitative and qualitative methods, and studies the main influencing factors of the learning feedback on the online learning engagement in the context of the self-directed learning platform. On this basis, it is continuously to improve and optimize the network learning, in order to provide references for the design of self-directed platform and the advancement of online self-directed learning quality.

2. Case Study

2.1 Study Object

In this paper, a total of 50 sophomores including 15 boys and 35 girls, who took German as the course of public foreign language, were selected from a university of technology in province

Shaanxi. Finally 48 valid questionnaires were returned. The testing platform is a German self-directed learning platform based on MOOCs. In addition to the questionnaire survey, 5 students were randomly selected for specific questions.

2.2 Questionnaire Design

2.2.1 Learning engagement metrics based on self-directed learning platforms

In this study the engagement scale was established based on the self-directed learning platform with reference to the common indicators of NSSE (National Survey of Student Engagement, USA) [14] and “Distance Learning Input Evaluation Scale”[15]. According to the depth of learning, the engagement scale was divided into three progressive components, involving 24 questions: regular attention (interested in self-directed learning platform), continuous online (persistent on the online self-directed learning) and self-directed engagement (in-depth study of what is learned). The scale uses the Likert 5-point scale, which corresponds to “completely disagree” to “completely agree” from 1 to 5 points. The higher the value is, the higher the engagement is achieved, and vice versa. According to the Cronbach's α coefficient, the reliability of scale was tested by using SPSS 21.0. It is illustrated that the internal consistency reliability of each dimension of this questionnaire is between 0.89 and 0.91. Then the factor analysis can be used to check the validity of the scale. It is shown that the KMO value is $0.832 > 0.5$, the P value is close to 0, and the other items are also ideal, which indicates that the scale has a good validity and is suitable for the study.

2.2.2 Learning feedback scale

Based on feedback intervention theory (FIT) [16], a corresponding online learning feedback scale was derived from the self-efficacy questionnaire [17], which combined with the basic characteristics of learning feedback and mainly included result feedback, process feedback, and motivation feedback. The result feedback consists of scores, learning strategies, grammar interpretation tips, correction analysis, extended reading, etc. The process feedback is composed by self-monitoring guidance and meta-recognition reflection. The motivation feedback includes various parts, such as interpretation, course value, individual encouragement, individual praise and emotional mobilization strategy, etc.. With 24 questions the feedback scale is realized by three dimensions: learning motivation, self-regulation and knowledge acquisition. The scale still adopted the Likert 5-point scoring method, with 1 point indicating “completely disagree” and 5 points meaning “completely agree”. The consistency of the different dimensions in the questionnaire is in the range of 0.87 to 0.89. Meanwhile, the validity test indicates that the KMO value is $0.808 > 0.5$, the P value is close to 0, and the other indicators also meet the measurement validity requirements, so it can be used to complete this study.

3. Results

This paper used SPSS21.0 statistical software to conduct correlation analysis and regression analysis on the survey data, and then the correlation between learning feedback and engagement on the basis of self-directed learning platform was also quantitatively tested.

3.1 Descriptive statistical analysis

In each scale three dimensions were utilized to calculate the data of learning feedback and that of the engagement taking into account the actual selecting situation of students in two scales, and to focus on the students' online participation status and learning feedback requirements (see Figure 1 and Figure 2). Hattie et al. referred that feedback received by students directly depends on the level of both learning effects and learning experiences[9]. By using feedback component analysis, students will draw much attention on the result feedback during the online learning, which proves that the result feedback has a greater impact on the engagement. Owing to clear planning and learning targets of students, learning effects can be corrected by diagnosing learning problems, and feedback can produce more benefits.

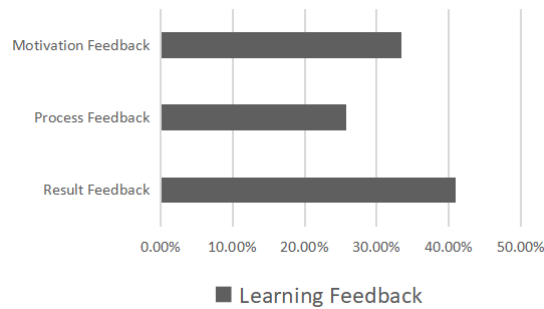


Fig. 1. Frequency Statistics of Learning Feedback in Components

In addition, the survey data of motivation feedback was reduced to 33.4%, and demand of process feedback was also declined to 25.7%. The analysis showed that the majority of people stress on the learning results. However, differences in personality and emotion of each person will result in diversity. Through full contact with students and analysis on the actual distribution of options, it can be concluded that students are lack of clear understanding for control ability and self-emotional needs. The basis of online learning is to achieve self-measurement and self-regulation, and urgently needs more corresponding feedback support.

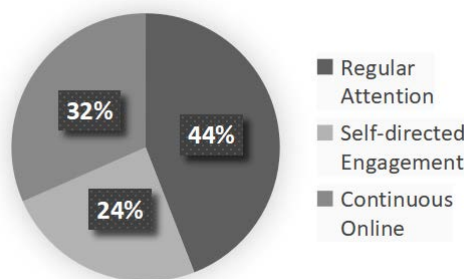


Fig. 2. Frequency statistics of Engagement in Dimensions

In the process of campus online learning, most students are relatively passive in the current state. Usually students complete tasks only for meeting the requirement of teachers, and there is a serious lack of activity and initiation. According to the data analysis results, 44.1% of students surveyed solely belong to the state of attention, while the actual number of students who participated in the online learning just accounted for 31.6%, and the number of continuous online was only 24.3%. Furthermore, the data shows that students as a group of adults are more independent. However, it is inevitable that they will be interfered by other aspects in the online environment without supervisory device, so that it is impossible to achieve high-quality online learning in the long-term. It can also be drawn by communicating with students interviewed that there are more factors leading to learning interruption. The most critical factor is a large temptation in the network, which seriously hinders learning and requires strong self-control. Therefore, process feedback is also one of the important factors affecting the level of online engagement.

3.2 Correlation Analysis

Through the Pearson correlation test, the correlation between the learning feedback and the engagement of the surveyed students was analyzed. The results are shown in Table 1. According to the data analysis, the feedback dimensions are positively correlated with the engagement dimensions. The knowledge acquisition (result feedback) has the greatest impact on the students' continuous online status. Its R value is 0.829, which is also strongly correlated with regular attention and self-directed engagement. Their R values are respectively 0.763 and 0.726. The results show that college students are highly independent and focus on mastering skills. Continuous online learning is intuitively represented through the time and continuity of learning and realized by self-

control. If students can get better feedback, which will promote their learning motivation and achieve a continuous online state. Moreover, the correlation of self-adjustment closes to dimensions of the engagement by the calculation, but the correlation with continuous online, which the R value is 0.600, is less than that of the other two. Furthermore, although self-adjustment (process feedback) can effectively restrict students' online learning and is directly related to students' online participation status, the effect of continuous learning on the engagement is not obvious. The correlation levels of learning motivation including emotional motivation with dimensions of the engagement are higher. It indicates that learning motivation is an important factor for the motivation feedback, which will directly or indirectly affect students' online engagement. The influence of learning motivation on self-directed engagement and continuous online is slightly above that of regular attention. In other words, motivation feedback exists in all stages of learning, and regular attention is paid to the initial stage of online learning. Appropriate emotional incentives will increase students' online participation. In the later stage, it will promote students' independent investment, make online learners feel more comfortable to maintain a good learning state, and to improve their continuity of online learning. In addition, the results show that the influences of result feedback and motivation feedback on the engagement are significantly higher than that of process feedback, which indicates that students need to solve practical learning problems more clearly assisting with emotional incentives and certain reward mechanisms, while external monitoring and evaluation are not ideal for improving their engagement.

TABLE I. Correlation analysis between learning feedback and Engagement

	Learning Strategy	Monitoring & Evaluation	Learning Motivation	Regular Attention	Active Engagement	Continuous Online
Learning Strategy	1	0.695**	0.763**	0.726**	0.742**	0.829**
Monitoring & Evaluation	0.695**	1	0.756**	0.693**	0.686**	0.600**
Learning Motivation	0.763**	0.756**	1	0.723**	0.760**	0.771**
Regular Attention	0.726**	0.693**	0.723**	1	0.648**	0.641**
Active Engagement	0.742**	0.686**	0.760**	0.648**	1	0.648**
Continuous Online	0.829**	0.600**	0.771**	0.641**	0.648**	1

**. Significantly correlated at .01 level (both sides)

From Table I, it is concluded that there are significant correlations between three dimensions of feedback, which reflect the continuity of the feedback process. The correlations between three dimensions of the engagement are also great. During the online learning process, students may regularly pay attention to the update of the course contents, but there is still a distance from active engagement and long-term online learning. The complexity of the self-directed learning platform in practical applications and the instability of students in the online learning process will be obviously presented. Therefore, feedback as conduction and supervision can effectively improve students' online learning participation

3.3 Regression Analysis

In order to analyze the influence of learning feedback dimensions on the students' online engagement with self-directed learning, dimensions of the learning feedback were taken as the independent variables, and the total score of engagement as the dependent variable. The regression analysis of the questionnaire data shows that the adjustment R^2 is 0.853, $p < 0.05$, which is indicating that learning feedback has a significant impact on the engagement. The specific results of each dimension are shown in Table 2.

It can be seen from Table 2 that knowledge acquisition and learning motivation have significant

regression effects with engagement, which is illustrated that both result feedback and motivation feedback can significantly influence on students' online engagement. However, the p value of self-adjustment is above 0.05, but the regression effect with the engagement is not noTable, which indicates that the impact of process feedback on the engagement is not dramatically.

TABLE II. Analysis of Learning Feedback on Engagement

	Independent Variable	B	β	t	p
Learning Feedback	Learning Strategy	0.511	0.503	5.701	0.000
	Monitoring & Evaluation	0.092	0.098	1.821	0.168
	Learning Motivation	0.417	0.402	4.150	0.000

4. Conclusions

4.1 Aiming at the result feedback and strengthening the input of the engagement

In this paper, it is shown that targeted feedback is more helpful than feedback with less directivity in solving students' practical problems in online learning. In addition to attributing and correcting problems which students meet during setting goals, this feedback also includes pointing out procedural issues and setting improvement measures. In the online self-directed learning platform, the higher the level of refinement of feedback is, the better learning effect learners have. Therefore, the feedback information of students' different learning states should be compared and analyzed to further identify its authenticity and accuracy, and then adjusted and improved learning tasks should also be fed back to help students correct and improve the problems existing in the knowledge components, so that the result feedback can be effectively utilized.

4.2 Taking motivation feedback as an opportunity to improve online engagement

The results indicate that the main motivation of students' online learning is value and emotion. Learning motivation is the key factor that affects learners to maintain online learning for a long time. Motivation feedback as a basic part directly influences three different dimensions of the engagement. It can be proved that it is decisive for the motivation of online learning to analyze motivation factors of learners, such as forward-looking, feedback intervention and evaluation. Hence, it should be firstly analyzed the emotion and cognitive state of learners for the design of the self-directed learning platform. The feedback information can be evaluated by connecting the positive attributes with the learning process. The information will have a direct impact on several aspects of the online engagement involving shaping learning and teaching, standardizing learning methods and environment, as well as incentive system, etc., so that the online engagement of students could be prolonged and their learning quality will be also improved.

4.3 Using process feedback as a means to ensure the continuity of online learning

According to the results, although the regression effect of process feedback and the engagement is not noTable, it has a certain correlation with dimensions of the engagement. Thus the process feedback is still an important factor affecting the engagement. Though students need more in-depth feedback guidance, due to the lack of self-control and adjustment awareness, there are still fewer students who are willing to take part in online learning and persist in a period of time. During the interviews with students, it was found that most students avoided to answer when applying the self-adjusting feedback strategy. Since they did not want to be intervened, humanized interventions should be set. Therefore, in the process of online learning it requires the guidance of peers or teachers, including long-term communication with students and more feedback information, in order that students can understand more clear about monitoring standards. Furthermore, the accuracy and functionality of self-evaluation will be improved. The self-regulation of students for the online learning should be encouraged, and problems of learners analyzed should be self-adjusted and self-monitored, so as to achieve continuous engagement.

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