Online Study: Understanding the Laws of Self-Regulated Study

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Abstract

Background:

The sudden COVID-19 outbreak has posed challenges to the normal development of continuing education for general practitioners. Consequently, an online medical training program for family doctors has emerged. Online study helps us better understand the laws of self-regulated learning because we can track the process and outcome of family physicians and compare it to that of face-to-face training programs. The study track the GPCC online program to reveal this principle.

Results:

By recording learners' study behaviors and explore the law of learning progress and analyse the impact of latent variables on learning through structural equation models,the study find that the the impact of teacher support and supervision and of internal motivation on learning input and the influence of teacher support and supervision on internal motivation can be researched through online study.

Conclusions:

Online study helps us better understand the laws of self-regulated learning. It helps to better understand the impact of teacher support, supervision, and internal motivation on learning input , as well as the influence of teacher support and supervision on internal motivation. Examining online study can also help in making effective use of the self-education characteristics of internal motivation and cultivate the ability of independent thinking and learning self-discipline .

Background

Continuing education is an important aspect of creating high-quality general practitioners (Barnett et al., 2014) (1). While this education should follow the principle of continuity (Barnett et al., 2016; Atkin et al., 1994) (2, 3), the sudden COVID-19 epidemic has raised many challenges in the normal development of continuing education for general practitioners. Thus, many of them have explored a remote-based continuous medical training program for family doctors (Biwer et al., 2021) (4).

Online study helps us better understand the laws of self-regulated learning because we can track the process and outcome of online study for family physicians and compare it to face-to-face training programs.

First, online study research can help us better understand continuing education and medical training, especially the applicability of its content and methods for family doctors. (Chiu et al., 2016) (5).

Second, Online study makes it easier to record and track learners' learning behaviors as compared to face-to-face-training programs (Catzikiris et al., 2018) (6).

Third, online study provides the opportunity to further examine the impact of manager supervision and self-efficacy on learning. Furthermore, it can help explore the impact of latent variables in learning through the use of structural equation models, such as learning input, teacher support and supervision, and internal motivation (Cobb et al., 2020; Dory et al., 2009) (7, 8).

Method

Sixteen participants were included in the 2020 General Practice Core Competence (GPCC) online program.The study record learners' study behaviors while they were in different supervision strategies without their notice. Then, this study compare and analyse their study behaviors and their study performance and score.

The impact of latent variables on learning through structural equation models.The impact of teacher support on learning input ,the influence of internal motivation on learning input and influence of teacher support and supervision on internal motivation were mainly studied.

Also the NASA-TLX scale can be used to examine whether learners actually put all their time and energy into the program or there is room for improvement and the study curve research can also be applied to online learning programs

Result

Study content for GPCC online program is as follows (Table 1). This program were developed during the COVID-19 pandemic when learner's may not able to participate in a face-to-face program.

Table 1
Study content and methods for GPCC online program

Activity	Description	Frequency
Pre-recorded learning video (9)	A total of 40 learning videos were recorded (each video is no less than 1 hour long and can be watched repeatedly within 1 year. The video format includes lectures and practices, lectures and cases, simulation workshops, etc.)	Completion of 80% is considered as qualified, and the first six must be completed before the one-to-one answering session. All study time is self-arranged
Online case discussion (9)	Including community typical case discussion (once a month), general ward case discussion (once a month), and family doctor contract case discussion (once a month)	At least three times, hosting can result in additional marks
Online one-on-one Q&A	Each learner has two appointment permissions and can make an appointment online one-on-one Q&A About 45 minutes/class hour/time	Using WeChat online group voice call technology, every Tuesday and Thursday night
Online group Q&A (10)	Cloud Classroom Q&A platform	Learners' leave a message at any time; the program manager replies every Friday
Self-diagnosis and skill operation recording display	Learn by watching videos; then demonstrate what they have learned on video and turn it in as an assignment	A certain time before the end of the program
Chronic disease management plan display	Learn by watching videos; then demonstrate what they have learned on video and turn it in as an assignment	A certain time before the end of the program
Medical record writing display	Learn by watching videos; then demonstrate what they have learned on video and turn it in as an assignment	A certain time before the end of the program
Offline skills training by standard patient	Body exam skill	At a certain time before the end of the program
Assignment	Including all of the above, as well as a self-study report	A certain time before the end of the program
Final exam	Including: 1. Process assessment; 2. Online completion assessment: Complete the exam online, answer time-limited questions, complete submission of a SOAP, complete ten GP case analysis, and complete one feedback on oneself; 3. the overall assessment is a comprehensive assessment of the project	At the end of the program

By employing various learning forms in the education process, such as watching, listening, speaking, operating, and experience, general practitioners' education will be all-rounded (Zheng et al., 2012; Flägel et al., 2019; GL et al., 2019; Dey and Mann, 2010) (11–14).

Compared to the face-to-face training program, an online study makes it easier and accessible to record and track learners' learning behaviors. On the online platform, we can monitor each learner's time input and activities, such as the number of times they watch the pre-recorded video lectures and the amount of time they devote to one particular lecture; their other behaviors can be examined as well, such as the number of times they participate in online case discussions. These aspects show how learners devote their time and effort in the self-regulated learning process and reflect their self-assessment regarding the stage of learning they are on. Furthermore, it reflects the many times repeat learning is efficient, the most effective number of revisions, and the number of revisions after which the efficiency decreases.

In the face-to-face training program, it is difficult to monitor or record the aforementioned aspects. For example, in the 2020 General Practice Core Competence (GPCC) online program (Fig. 1), between timelines AB, BC, and CD, different supervision strategies were employed. From point A to B, the program manager chose not to tell the learners that they will be monitored but simply stated that they must do the mandatory homework; line AB reflects the learners' attitudes and learning skills or the grasp over the basics. From point B, the program manager informed the learners that they would be supervised and monitored and required to complete 80% of the videos to qualify the finals. Before taking the one-to-one survey, they were required to watch six videos. Finally, from point C, after checking the assignment, the program manager concealed the fact that the learners would continue to be monitored till the final exam. Such changes in the supervision and monitoring strategy can reveal some of the real study behaviors of learners and help examine the law of learning progress.

Discussion

Structural Equation Modelling is a technique for simplifying and abstracting the elements of a specific problem into variables and then using a theoretical basis to summarize the possible correlation or causality between them. It converts this relationship into a mathematical model.

Many scholars have discussed the factors that influence learning input to improve learner performance. Internal motivation, self-efficacy, learning strategies, teacher support and supervision, family education, school belonging, and relationships with others have been found to influence learning input in previous studies. Several research results point out that internal motivation refers to the motivation within individuals who believe that learning activities are valuable for their development. The conditions for satisfying the motivation lie within the activities undertaken; therefore, when the learners enjoy the activities, they can concentrate more. External influences promote learning input; teacher support and supervision, as the most powerful and direct source of support for learners' learning in school, can effectively promote learning input.

When there is supervision, the overall frequency of watching videos increases. When assignments and exams approach, the frequency of video-viewing rises rapidly.

The impact of teacher support on learning input

Teacher support and supervision is an extremely important environmental variable that can promote learners' learning input (Wearne, 2016; Sturman et al., 2021) (15, 16). Most of the autonomous cognitive support provided by teachers is to simplify content to promote learners' understanding and, more importantly, to give learners enough space for thinking as they achieve cognitive input in learning in the process of understanding. However, it is not enough for learners to internalize emotion and cognition after perceiving the various supports provided by teachers; they must, more importantly, implement it in their behavior, which is inseparable from the continuous role of internal motivation.

The influence of internal motivation on learning input

Internal motivation is an important factor in individuals' variables of learning, enabling learners to maintain a state of active exploration and to effectively and continuously engage in learning (Huang et al., 2020; Kramer et al., 2007; Michels and Vanhomwegen, 2019) (17-19). Positive emotions such as the feeling of competence can effectively arouse emotional investment in learning (Stensrud et al., 2012; Sturman et al., 2021; Ruzek et al., 2012) (20-22). Simultaneously, if learners are unable to moderate their emotions on their own, they can also stimulate their inner interest in learning by obtaining emotional feedback from teachers. It can be transformed into the process of behavioral investment through continuous internalization (Trivedi et al., 2018) (23).

The NASA-TLX scale (Finomore et al., 2013) (24) can be applied to online learning programs. It shows the learners’ energy load and the relationship with the study task (Zheng et al., 2012) (11). Although learners may be busy working, they still need to plan their time input and energy in the GPCC online program. The NASA-TLX scale can be used to examine whether learners actually put all their time and energy into the program or there is room for improvement (Flägel et al., 2019) (12).

Furthermore, the study curve research can also be applied to online learning programs. It can help examine aspects like the number of times a learner needs to watch a particular video to feel satisfied and the amount of time each attempt takes. Whether these aspects are consistent with the on-site learning curve needs further examination needs to be studied further. (GL et al., 2019; Dey and Mann, 2010) (13, 14)

Influence of teacher support and supervision on internal motivation

Teacher support and supervision can stimulate learners' internal motivation and maintain a high level of state (Kramer et al., 2007) (18). This can be understood as learners' hard work to meet these three needs related to their self-development (Ingham et al., 2020) (25). After extensive exploration by the researchers, it was found that the three types of support provided by the teacher as perceived by the learners can effectively stimulate their internal motivation and even keep this state for a long period. For example, part of the autonomous support provided by the teacher is the choice of learning resources; the teacher can skillfully use the internal cohesion of knowledge to stimulate learners' interest in learning, leading to an investment in it.

Conclusion

Online study helps us better understand the laws of self-regulated learning. Closely examining the processes and outcomes of online and offline study allows us to record learners' learning behaviors and explore the law of learning progress; it also helps to better understand the impact of teacher support, supervision, and internal motivation on learning input (Yokoyama, 2018) (26), as well as the influence of teacher support and supervision on internal motivation. Examining online study can also help in making effective use of the self-education characteristics of internal motivation and cultivate the ability of independent thinking and learning self-discipline (GJ, Jr, 2009) (27). Learners must internalize the teacher's teachings into their behavior, learn to learn, and learn to be self-disciplined (Yurko et al., 2010) (28). Therefore, this study highlights that online study helps us better understand the laws of self-regulated learning regarding all of the above aspects.

Abbreviations

GP: general practice; GPCC: general practice core competence

Declarations

B. Ethics approval and consent to participate

The research has get the ethics approval of west china hospital ethic committee with the number 2020YFQ0011.All methods were carried out in accordance with relevant guidelines and regulations and informed consent was obtained from all participants by written after the program.

C. Consent for publication

The manuscript contains is consent for publication.

D. Availability of data and material

All data and materials is of availability in manuscript

E. Competing interests

There are no competing interests. The research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

F. Funding

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G. Authors' contributions

All authors participated in the design of the study and contributed to the drafting of the paper.RX designed the research and was major contributor in writing the manuscript.LL and SQ guide the discussion parts ,WX performed the result , All authors read and approved the final manuscript.

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Figures

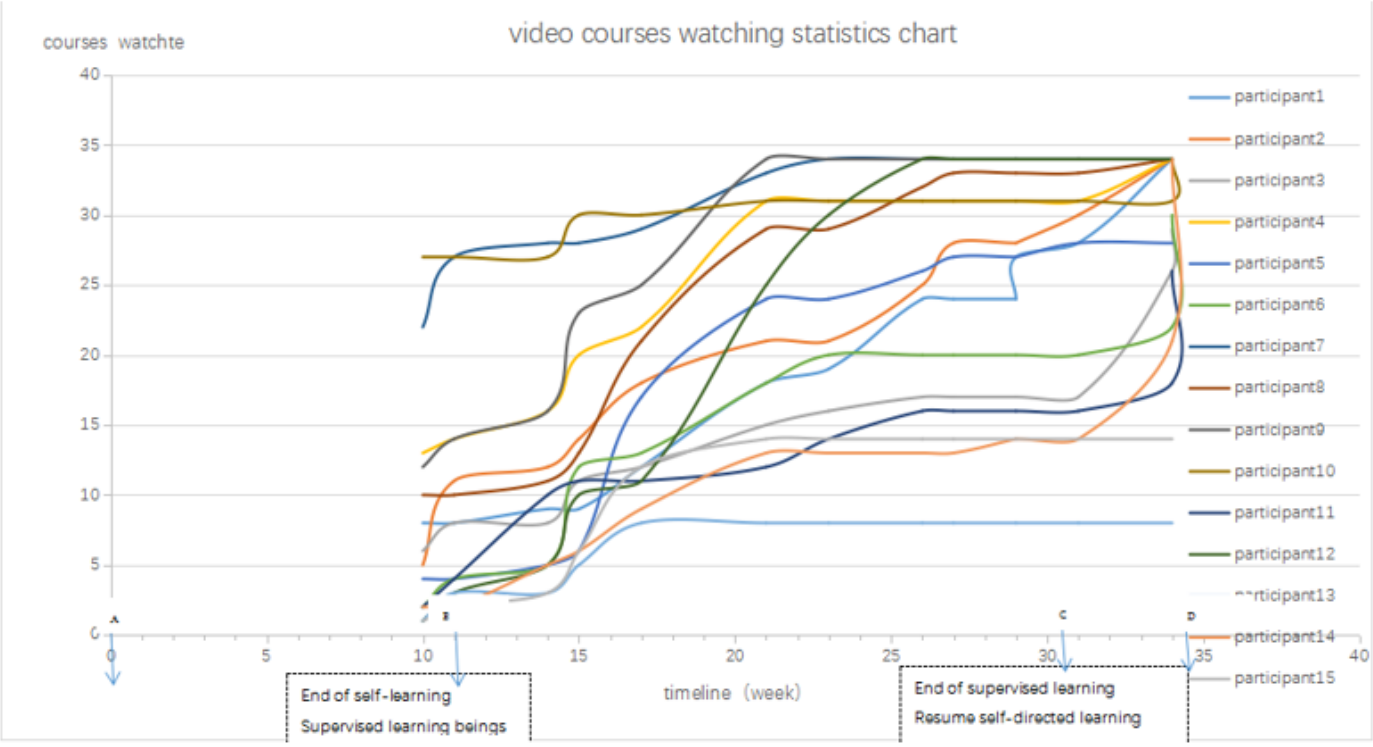

Figure 1

in the 2020 General Practice Core Competence (GPCC) online program (Figure 1), between timelines AB, BC, and CD, different supervision strategies were employed.