The Relationship Between Perceived Needs Support And Students' Performance Of Self-Regulated On-Line Learning

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***Abstract* – Self-regulated learning (SRL) ability is a critical skill to guarantee life-long learning in today's knowledge driven society. It is also an essential quality criterion for college talents training in China. With the rapid development of information technology and the influence of pandemic, self-regulated on-line learning has become a common practice in Vocational school in China. However, Chinese students' self-regulated learning is weak, especially in vocational school. This article will adopt a correlational study. The purpose of this article is to investigate the influence of students' perceived needs support on students' self-regulated on-line learning and therefore give some light on the enhancement of self-regulated on-line learning. According to the self-determination theory, this article will divide the perceived needs support into three different types: autonomy support, competence support and relatedness support. And the on-line self-regulated learning behaviour will mainly focus on goal setting and time management. Regression analysis will be conducted to reveal the relationship between the perceived need support and on-line self-regulated learning behaviours. The result shows that there is significant positive correlation between autonomy support, competence support and SRL behaviors, while no correlation is found between relatedness support and SRL behaviors. This article focuses on two SRL variables, further studies can explore more SRL variables.**

***Keywords* – Time Management, Goal Setting, Perceived Needs Support, on-Line Learning**

I. INTRODUCTION

In the era of Industrial Revolution 4.0, the modern smart technology has closely integrated with people's way of life, meanwhile it is influencing and changing all areas in our daily life (Zagami et al., 2018). As for the area of education, more and more teachers have adopted technology into their teaching design or training system. In return, learners and teachers have got advantages from the technical devices. Along with this technical reform in education, there emerged many professional terms like digital learning (D-learning), electronic learning (e-learning), mobile learning (M-learning), and the specific mobile assisted language learning (Mall). All these learning types have adopted technology, so are also named technological learning or technology-enhanced learning, which in this article, is referred to as "on-line learning".

On-line learning breaks the limits of time and space. It is a good supplement for traditional classroom learning. On-line learning allows learning to happen in the informal setting or non-academic learning environment, and therefore, will advocate life-long learning which is drawing increasingly attention world-wide (Burston, 2013). In the past decades in China, Technology-enhanced learning is booming due to political, economic, cultural and technical factors (Tang, et, al., 2016). Firstly, the Chinese government has been dedicated to implement the internet plus strategy, educational normalization, and the construction of learning city in the recent years, all these beneficial policies have created an idea environment for the acceleration of Technology-enhanced learning development. Secondly, Technological advances continues to reduce the manufacturing cost of technique learning device (mobile phone) and network facilities and services, which enlarge the access to internet and make technology-enhanced learning feasible and dominant. Thirdly, the fast-paced modern life makes people have limited and fragmented time for learning. More and more people prefer to learn on their way when they are waiting for the bus, lining up, on a commute, etc. Relatively speaking, technology-enhanced learning (mobile as the main tool) is more suitable for fragmented and lightweight modern education needs (I research, 2017).

On-line learning mostly happened out of class, and are more likely to be less instructor or teacher oriented and more learner oriented, which means it will require more self-regulatory skills. Prior research found that learners had learning difficulty under on-line learning environments because they do not use essential self-regulated learning (SRL) strategies (Azevedo, 2005). Research also found that SRL processes is a critical condition to enable learners to successfully learn in online setting (Winters, Greene, & Costich, 2008). This is also proved by the significant positive correlation between SRL strategies and online academic achievement found in meta- analysis by Broadbent and Poon (2015).

II. PROBLEM STATEMENT

Chinese vocational school students are the so-called "left over" students in the Chinese College Entrance Examination due to their weaker academic performance (Mok, 2001; Li, 2004; Yang, 2004; Zha, 2012; Liu & Wang, 2015). Therefore, the self-regulatory skills of students in Chinese vocational schools are especially low. The current research on self-regulation in China are more focused on the university students in Higher education, there is a critical need to pay more attention for students in vocational school. Besides, the SRL research in China higher education are more focused on the internal influence instead of the social, environmental influence (Xiao, et. al, 2011).

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III. LITERATURE REVIEW

Self-regulated Learning

Investigation on self-regulation amid learning was initially developed from the mental examinations into the improvement of self-control by grown-ups and children (Zimmerman, 2001). Most of the early self-regulation research was conducted in clinical settings where participants were guided to change their dysfunctional behaviors such as drug addictions, sexual disorders and other similar behavioral problems at home and school (Mace & West, 1986). The successful study on children's self-control behavior in eating and task completion has encouraged and inspired the educational scholars to further expanded self-regulation research from general setting to specific academic learning and achievement (Zimmerman 1989). The articles of self-regulation were initially published in journals on social psychology and personality in the 1980s, only in 1990s more self-regulation articles are published in educational, organizational, clinical and health psychology journals. Different approaches come out with different definition and models of self-regulations (Boekaerts, et al., 2000). Though the research approaches vary, researchers all come to the conclusion that self-regulation involves these key elements: "self-regulation involves cognitive, affective, motivational and behavioral components that provide the individual with the capacity to adjust his or her actions and goals to achieve the desired results in light of changing environmental conditions" Zeidner et al.,2000, pp.751).

The essence of self-regulation is learner's choice (Schunk, 2012). So, to trigger self-regulation, students must have the freedom to choose whether or not to participate, learning method they prefer, the goals they will pursue, the social and physical settings they will work in. Self-regulation can take many forms. Most notably, it involves behavioral, cognitive and affective variables. To keep themselves focused on goal attainment, learners must self-regulate their behaviors, cognition and affects, and constantly valuing their learning, keeping self-efficacy for learning, have positive expectations for learning outcomes, evaluating their goal process, evaluating the effectiveness of the strategies and making adjustment accordingly, preserving a positive emotional climate (Schunk, 2000).

Zimmerman's cyclic process model is widely adopted due to its comprehensive but simple structures (Panadero, 2017). This model covers the complete process before, during and after task engagement. It classifies the SRL process into three phases: the forethought phase, the performance control phase, the self-reflection phase.

There are many self-regulated variables under Zimmerman's model. Numerous researches have proved that these SRL constructs are positively connected with academic success in traditional classroom setting (Schunk, 2000). Scholars hold that students' self-regulated learning strategies and behaviors in the technology-enhanced learning environment will be different from the traditional classroom setting, and its contribution of each individual construct to academic achievement will not be the same as that of its counterpart in traditional setting (Broadbent & Poon, 2015). Some hold that SRL will be even more important for on-line setting than the traditional environment, as the former normally happen in the informal setting, involves less teachers and peer interactions, on-line students' needs to be more independent and conduct self-directed learning (Serdyukov & Hill, 2013).

In the past decades, many scholars had investigated SRL under the technology-enhanced learning environment, but not all self-regulated variables have the same influence （Junyi Li, et al., 2018). As the study of SRL in the technology-enhanced learning setting is relatively new, not all SRL variables are adequately studied （Junyi Li, et al.,2018). Among all the SRL constructs, goal setting and time management draw wide attention of investigation under technology-enhanced learning setting and gained empirical support for its correlation with academic performance. Time management refers to the ability to plan study time and tasks (Effeney, Carroll, & Bahr, 2013). Most studies found a significant positive relationship between time management and online learning achievement (Chan Lin, 2012; Michinov et al., 2011), however, several studies did not find a significant relationship (Klingsieck et al., 2012). Erwin Handoko (2016) compared the SRL strategies between MOOC completers and non-completers and found that the completers are better at goal setting and time management. The research compared 643 MOOC students using the Online Self-Regulated Learning Questionnaire (OSLQ), and found that the MOOC completers show stronger goal setting and time management behavior during self-regulated MOOC learning. The research also indicates that goal setting and time management are more important for MOOC completion than other SRL variables. Goal setting have also been found to support higher student performance (Kizilcec et al., 2017; Erwin Handoko, 2019).

To summarize, the technology-enhanced learning environment involves more self-directed learning, less teacher instruction, supports more flexible learning time than the traditional setting. All these new learning features lead to different self-regulated learning behavior. The investigation of SRL under the on-line setting is under-investigated. Different SRL variables have different effect on academic performance. Although SRL models contains many variables, this study will focus on goal setting and time management only, which are regarded as greatly associated with academic success in on-line learning environment.

Self-determination Theory (SDT)

SDT is a macro motivation theory which provides a theoretical framework to understand how motivation regulate one's behaviors. SDT divides motivation into two types： intrinsic and extrinsic motivation. The intrinsic motivation explains people's choices of tasks or activities they are interested in. Extrinsic motivation can explain people's engagement in activities not so interesting. SDT proposed that human being has three basic psychological needs: the needs for autonomy, competence and relatedness (Ryan & Deci, 2000). These three needs are universal and essential for all human beings. The fulfillment of the needs

increased the internal motivation or autonomous external motivation, and promote the learning outcomes. Autonomy is "behavior as volitional and reflectively self-endorsed" (Niemiec & Ryan, 2009, pp. 135); competence is the "sense of effective interaction with the environment" (Niemiec & Ryan, 2009, p. 3). Relatedness is "associated with a student feeling that the teacher genuinely likes, respects, and values him or her" (Niemiec and Ryan, 2009, p. 139). SDT provides a lens to examine the interaction among individual motivation, contextual support, and educational outcomes (Deci & Ryan, 1985; 2012).

SDT is so far the most comprehensive and widely validated theory for motivation (Pintritch, 2004). It has been tested in various domains, like parenting, environmentalism, institutional reform, sport, medicine and education. Despite the wide application of SDT in face-to- face learning setting (Ryan & Deci, 2020), the research of SDT in on-line learning environment is relatively rare (Broadbent & Poon, 2015), the wide application and research using SDT in traditional setting implies that it can also be applied in the virtual teaching and learning settings, as proved by some initial research done by Chen & Jang (2010). Ryan and Deci (2020) suggested that future SDT research should look more closely at how technologies in e-learning and remote classrooms motivate student engagement and learning.

SDT not only focus on individual performance but also on how other social and cultural factors will promote individual's internal or autonomous motivation (Deci & Ryan, 1985). Thus, it can provide a framework to understand the relationship between contextual support and individual behaviors.

In online learning, teacher behavior plays a crucial role in promoting student motivation and on-line learning performance (Chiu, 2022). Teachers can achieve this through encouraging students' autonomy, insuring learning, and being personally involved (Hartnett, 2015). Based on SDT theory, teaching practices can be categorized into autonomy support (autonomy), structure/competence support, and involvement /relatedness support (Lietaert et al., 2015; Sierens et al., 2009; Vollet et al., 2017). Autonmy support entails encouraging and assisting students in pursuing their personal goals, as well as encouraging student endorsement of learning habits (Assor et al., 2002). In on-line learning, autonomy-supportive teachers care for students' opinion, provide learning options, minimize dominating language, and decrease unneeded stress and demands on students (Alamri et al., 2020; Trenshaw et al., 2016; Xie et al., 2006). The environment enables students to make their own choices according to their personal goals (Alamri et al., 2020; Trenshaw et al., 2016). As a result, students who perceived more autonomy support from their teacher have better time management （also referred as behavioral engagement） (Vansteenkiste et al., 2005). Autonomy gives students the freedom and encourage them to set their learning goals (Bedenlier et al., 2020).

Competence support means expressing clear expectations to student behavior (Sierens et al., 2009). This can be done by giving competence-relevant feedback, expressing confidence in student abilities (Hartnett, 2015), and distributing effective learning materials to achieve desired outcomes. When the competence need is satisfied, students will feel a mastery of the content being studied and proactively engage in learning activities, and hold a positive attitude towards the course. This will lead to better behavioral and emotional engagement (Reeve, 2013).

At the same time, Scislo (2018) also found the positive correlation between environmental supports for autonomy, competence, and relatedness and the self-regulated learning behaviors. Meanwhile, Murillo-Wilbur, Lyda (2014) who investigated self-efficacy for self-regulated learning found that relatedness support influence self-efficacy the most, closely followed by competence support and lastly autonomy support.

Conclusion

As mentioned above, both SDT and SRL are regarded as positively related to students' academic success. SDT theory hold that the satisfaction of basic needs will promote students' academic performance. SRL model provide a clear framework to understand the specific strategies and behaviors during the learning process. However, both SDT and SRL under on-line setting hasn't been investigated exclusively (Broadbent & Poon, 2015). Prior researches proved that SDT theory and SRL can be integrated with each other (Sweet, Fortier, Strachan, Blanchard and Boulay, 2014).

A better understanding of the relationship between students' perceived need support from teachers (based on SDT) and their major SRL behaviors ((based on SRL) would be beneficial to research and practice related to on-line learning and teaching. This is especially true in Chinese higher vocational context, where most students are having poor academic performances and low self-regulated ability. This study, therefore, intends to examine the association between the perceived need support from teachers and SRL behaviors (strategies) in on-line setting. Though there are many SRL strategies, in this article, we focus on time management and goal setting.

The research has two objectives that are to;

1. Identify the perceived needs support (from the teacher) influencing self-regulated learning behavior of time management that learners deploy in an on-line learning setting.
2. Identify the perceived needs support (from the teacher) influencing self-regulated learning behavior of goal setting in an on-line learning setting.

Consequently, the research is to answer these two questions;
Q1: What is the relationship between the perceived needs support (from the teacher) and self-regulated learning behavior for time management in an on-line setting?
Q2: What is the relationship between the perceived needs support (from the teacher) and self-regulated learning behavior of goal setting in an on-line setting?

IV. METHOD

Design and Participant

This is a correlational study using a convenient sampling method on one Senior Chinese Vocational school in Southern China. A total of 508 responses were collected,

among which 33 were excluded due to omission in the filling, inconsistency in the filling option or a clear regularity of the answer. There are totally 475 (93.5%) valid questionnaires remaining after the invalid samples were excluded. Among the valid samples, the majority gender is male (n=274, 57.7%), samples are equally distributed in three grades, while grade three students count for a slightly higher proportion (n=170, 35.8%). Most students had on-line courses learning experiences, which are the study object of this study (n=287, 60.4%).

Measurements

Perceived Needs Support Scale: The questionnaire is adapted from Psychological Needs Satisfaction Scale in Physical Education by Jing Dong Liu (2014) which has been validated for Chinese secondary school students in Physical Educations (PE) domain. To meet the purpose of this study, we replace the term "PE class" with "on-line class", and removed the domain specific items. The modified questionnaire contains 14 items and 3 dimensions: autonomy support, competence support, and relatedness support. The questionnaire requires participants to self-report their perceived need support during on-line learning experience. The questionnaire uses a Likert 7-level rating, with 1 for completely disagree, 4 for agree, and 7 for completely agree. The total score for all items is calculated, and the higher the score, the stronger the perceived needs support of the participants. In this study, the internal consistency of the questionnaire Cronbach's α coefficient was 0. 858.

The on-line Self-regulated learning behavior scale: The self-regulated learning behavior questionnaire are adapted from OSLQ (Barnard, Lan, To, Paton, & Lai, 2009) and MSLQ (Pintrich, Smith, Garcia, & Mckeaechie, 1993). The former is a relatively new scale for SRL process measurement in on-line setting, the latter is the most widely used scale in SRL field, including the on-line setting. The original questionnaire contains several items, to meet the purpose of this study, we only select the scales for time management and goal setting. The final questionnaire contains 9 items and 2 SRL behavior variables: time management and goal setting. The questionnaire requires participants to self-report their self-regulated learning behavior during on-line learning experience. The questionnaire uses a Likert 7-level rating, with 1 for completely disagree, 4 for agree, and 7 for completely agree. The total score for all items is calculated, and the higher the score, the better the self-regulated behavior of the participants. In this study, the internal consistency of the questionnaire Cronbach's α coefficient was 0. 863.

Data collection

The purpose of the study is to test the correlation between students' perceived needs support of on-line learning and self-regulated learning behaviors. This study was conducted with the consent of school leaders, teachers and students. The on-line Self-regulated learning behavior questionnaires and perceived needs support questionnaire were sent to samples through Wen Juanxing, a famous Chinese on-line questionnaire collection platform. The responses were collected after 10 days of the delivery. Data processing is carried out using SPSS 26. 0 Software proceeds.

Data analysis

This study used Harman's one-factor test, to test the common method bias for the scales. The data was processed using SPSS 26.0. The first step was to use descriptive statistical analysis to calculate the mean and standard deviation of all variables. The second step is to examine the variables using Pearson correlation, and the third step is to perform multiple regression analysis. The details are presented below.

V. FINDINGS

Common Method Deviation Analysis: This study used a self-report questionnaire for data collection, which may lead to common method bias. According to the suggestions of Zhou Hao and Long Lirong (2004), in terms of overall control, we used Harman's one-factor analysis. The results showed that 5 common factors had values greater than 1 and rejected. The unrotated first factor explained that the variance was 30.803%, not greater than 40%, and there was no obvious common factor that explained most of the variation, indicating that the scale passes the test of homologous method deviation.

The Correlation Coefficient analysis: The Correlation Coefficient analysis of five variables, namely the perceived support for Autonomy need, Competence needs, Relatedness Needs, Goal Setting, and Time Management, was analyzed by SPSS26.0, and the results are shown as in below Table 1.

TABLE 1: CORRELATION COEFFICIENT MATRIX

	1	2	3	4	5
1 Autonomy Support	1				
2 Competence Support	.224**	1			
3 Relatedness Support	.145**	.320**	1		
4 Goal setting	.302**	.442**	.208**	1	
5 Time management	.397**	.363**	.149**	.409**	1
Mean	4.967	4.884	4.924	4.983	4.935
Std. Deviation	1.105	1.170	1.307	1.117	0.982

Generally speaking, all these variables are positively correlated with each other. This is further supported by regression analysis between perceived needs variables and self-regulated learning behavior variables.

Regression Analysis 1: In this study, SPSS26.0 was used to analyze the effects of the perceived autonomy needs support, competence support, and relatedness support on goal setting.

The results are shown in the following table, the R-side of the model is 0.242, and the degree of interpretation of independent variable autonomy support, competence support, and relatedness support for target setting is 0.242. The results are shown in the following table, the F value is

50.106, and p is less than 0.001, indicating that the independent variable autonomy support, competence support, and related support have a significant impact on goal setting. The regression coefficients and their significance test results are shown in the following Table II.

Autonomy support (B=0.212, p<0.001) and capability support (B=0.360, p<0.001) have significant positive influences on the dependent variables of goal setting. Relatedness support (B=0.049, p=0.179>0.05) has no significant influence on the dependent variable of target setting.

TABLE II: REGRESSION ANALYSIS ON THE INFLUENCE OF NEEDS SUPPORT ON GOAL SETTING

Variable	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	1.933	0.272		7.093	0.000
Autonomy support	0.212	0.042	0.209	5.069	0.000
Competence support	0.360	0.041	0.377	8.745	0.000
Relatedness support	0.049	0.036	0.057	1.346	0.179
R	0.492				
R^2	0.242				
F	50.106***				

***P＜0.001

Regression Analysis 2: Another multiple regression to analyze the effects of autonomy support, competence support, and relatedness support on time management. The results are shown in the following table, the R-side of the model is 0.236, and the explanatory degree of independent variable autonomy support, competence support, and relatedness support for time management is 0.236. The results are shown in the following table, the F value is 48.591, and p is less than 0.001, indicating that the independent variable autonomous support, ability support, and association support have a significant impact on time management. The regression coefficients and their significance test results are shown in the following table. Autonomy support (B=0.294, p<0.001) and competence support (B=0.240, p<0.001) both have significant positive impact on the dependent variable time management. While relatedness support (B=0.007, p=0.816>0.05) had no significant effect on the time management variable.

TABLE III: REGRESSION ANALYSIS ON THE INFLUENCE OF NEEDS SUPPORT ON TIME MANAGEMENT

Variable	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	2.266	0.24		9.426	0.000
Autonomy support	0.294	0.037	0.331	7.992	0.000
Competence support	0.240	0.036	0.285	6.594	0.000
Relatedness support	0.007	0.032	0.01	0.233	0.816
R			0.486		
R^2			0.236		
F			48.591***		

***P＜0.001

VI. DISCUSSION

In this study, the correlation between student's perceived needs support from the teachers and their on-line self-regulated learning behaviors, specifically time management and goal setting were tested. The study reveals that autonomy support （ B=0.212 ， p ＜ 0.001 ） and competence support （ *B*=0.360 ， *p* ＜0.001 ） have a significant positive influence towards goal setting, while relatedness support （*B*=0.049，*p*=0.179＞0.05）has no significant influence on goal setting. Besides, autonomy support B=0.212，p＜0.001）and competence support（ *B*=0.360，*p*＜0.001） have a significant positive influence towards time management, while relatedness support （ *B*=0.049，*p*=0.179＞0.05）has no significant influence on time management.

The results of the present study are consistent with previous research findings that the perceived teacher support increase the on-line self-regulated learning (Sierens, et al., 2009; Hartnett, 2015). Relatedness support is found to support self-efficacy, a key variable for self-regulated learning (Murillo-Wilbur, Lyda, 2014), However, in this study, there is no obvious correlation between relatedness support and time management and goal setting. This indicate that perceived needs support exerts different influence on different SRL variables.

VII. CONCLUSION

The present study has some limitations. This study uses a self-reported questionnaire method that may be with a social desirability and subjective bias. Therefore, future research can take the form of multi-role reporting, like the report of teachers and parents. and the SRL behaviors can also be collected directly from the website record, by data mining or other method to reduce subject bias. The subject group in this study are from the same higher vocational college in Guangdong, where information literacy of students and teachers, penetration rate of digital facilities in campus are superior to those of ordinary vocational colleges, and the research conclusions have certain limitations when they are generalized to remote areas.

Despite the shortcomings, this study has certain theoretical significance and practical significance for the on-line learning and teaching in China higher vocational school. Firstly, it tested the influence of perceived needs support on self-regulated on-line learning behaviors, which is under investigation in the senior vocational school context. Therefore, it can provide some reference for future studies in this field. Secondly, this study reveals that students' perceived need support (autonomy support and competence support) positively influence their time management and

goal setting during on-line learning, which provide teachers' some practical implication in future on-line course design and implementation.

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