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A pathway to learner autonomy: a self-determination theory perspective

Pingying Hu[1] · Jiaxiu Zhang[1]

Abstract Concepts of learner autonomy and the self-determination theory provided a theoretical rationale for the action program for learner autonomy. The action program incorporated satisfying learners' basic psychological needs into English Foreign Language (EFL) course education. The action program was implemented for one academic year. Both qualitative and quantitative methods were used in this study. Outcomes of the action research indicated that (1) the satisfaction of learners' needs for autonomy, competence, and relatedness facilitated them to move along the "learner autonomy continuum" from dependence to autonomy, which was in agreement with the process of internalization of extrinsic motivation; (2) the students' English proficiency improved with the progress of learner autonomy; and (3) the implementation of the action program for one year was not enough to cultivate fully autonomous EFL learners. The study implied that collaborative learning played an important role in fostering learner autonomy in China and that instrumental motivation and educational culture also had impacts on learner autonomy development.

Keywords Learner autonomy continuum · Psychological needs · Self-regulated learning · Self-determined motivation

Introduction

Many English foreign language (EFL) practitioners in China feel depressed at the fact that around ten-year EFL education cannot help students be fluent in the English language. Although the situation is much better after decades of reform and innovation, much remains to be done. As EFL practitioners, we share Harmer's (2001:335) opinion that however good a teacher may be, students will never learn a language unless they aim to learn outside as well as inside classroom. To compensate for the limits of classroom time and to counter the passivity, students should develop their own learning strategies so that as far as possible they become autonomous learners. However, this does not happen automatically, most students need to be motivated and trained to be such learners. How to effectively motivate and train students to be autonomous EFL learners is the research question in this study, which leads to the hypotheses that (1) satisfying learners' psychological needs for autonomy, competence, and relatedness would motivate them to regulate their learning behavior positively to achieve their goal (Deci and Ryan 1985, 2000) and (2) equipping learners with metacognitive strategies and EFL cognitive strategies will empower them to learn effectively and autonomously. The aim of this study is to facilitate EFL learners to move along the "learner autonomy continuum" from dependence to autonomy by planning and implementing a pedagogical action program which incorporates meeting learners' basic needs into EFL course education.

Literature review

Concepts of learner autonomy and the self-determination theory (SDT) provided a theoretical rationale for paving a

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Table 1 The learner autonomy continuum

Innate needs	Needs thwarted	→	→	Needs satisfied
Motivation/behavior	Non-self-determined	→	→	Self-determined
Types of behavioral regulation	External regulation	Introjected regulation	Identified regulation	Integrated regulation
Levels of learner autonomy	Dependence	Relative dependence	Relative autonomy	Autonomy

pathway to EFL learner autonomy in the study. Noteworthily, the "autonomy" in learner autonomy was not the same thing as autonomy in SDT. Learner autonomy was defined as the ability to take charge of one's own learning (Holec 1981: 3), while autonomy in SDT referred to the experience of volition and the self-endorsement of one's activity (Ryan and Deci 2006, 2000).

Learner autonomy

Autonomy in language learning depended on the development and exercise of a capacity for detachment, critical reflection, decision making, and independent action (Little 1991: 4); autonomous learners assumed responsibility for determining the purpose, content, rhythm, and method of their learning, monitoring its progress, and evaluating its outcomes (Holec 1981: 3). Littlewood (1996) pointed out that autonomy contained two key components: learners' ability and their willingness to make choices independently. Benson (2001) defined autonomy as the capacity to take control of one's own leaning, which was based on his desire, ability, and freedom to control. The definitions explained what autonomous learners were able to do, rather than how they were able to do it. Subsequently, much concern shifted to training and developing autonomous language learners within classroom, which focused on methodology of language teaching and learning with autonomy. Hedge (2000) framed an approach to learner autonomy via learner training. Harmer (2001: 336–340) suggested learner training, classroom decision making, and out-of-class learning. Kumaravadivelu (2003) focused on how classroom learning could be shaped and reshaped by teachers as a result of self-observation, self-analysis, and self-evaluation. These teaching methods for classroom autonomy set a framework for an action research. Ushioda (1996: 2) stated that autonomous language learners were by definition motivated learners. In other words, learner autonomy is closely related to self-regulation which was understood as 'the degree to which individuals are active participants in their own learning' (Dörnyei 2005:191). Accordingly, learning motivation and learning ability are two basic premises for autonomous or self-regulated learning.

Self-determination theory

Self-determination theory (Deci and Ryan 1985, 2000) is a macro-theory of motivation explaining the relation of human needs for autonomy, competence, and relatedness to self-determined motivation and self-regulated behavior. According to SDT, when three innate psychological needs are satisfied, people take in social values and extrinsic contingencies and progressively transform them into personal values and self-motivations, which generates positive self-regulated behavior and well-being, whereas thwarting the needs leads to diminished motivation and well-being. L2 Motivational Self System (Dörnyei 2009) and Directed Motivational Currents (DMCs; Dörnyei et al. 2015) stress the great motivational potential of goal-oriented personal vision in language learning. Both of them have a strong link to SDT, especially to autonomy, self-determination, and self-regulation. Deci and Ryan (2000: 263) also claimed that social contexts supportive of the basic needs maintained or enhanced intrinsic motivation and facilitated the internalization of extrinsic motivation, resulting in more autonomous motivational or regulatory orientations. Dörnyei (2005) confirmed that teachers who were autonomy supportive and non-controlling promoted intrinsic and self-determined orientations of motivation in students in the language learning classroom. Three basic needs in SDT overlap with Benson's (2001) definition of learner autonomy to a certain extent. Namely, Benson's capacity and freedom to control one's own learning refer to competence and autonomy in SDT, while desire means learning motivation.

Learner autonomy continuum

There are levels and degrees of learner autonomy. Dependence and autonomy are not categorically distinct, but exist on a continuum (Nunan 2003). The authors proposed a working "learner autonomy continuum," consisting of four levels: dependence, relative dependence, relative autonomy, and autonomy (Table 1). The continuum sets a link between need satisfaction and learner autonomy because the four levels of learner autonomy are, respectively, related to SDT's four types of behavioral regulation in the process of internalization of extrinsic motivation: external regulation,

introjection, identification, and integration. Different types of behavioral regulation are based on and aligned with varied degree of need satisfaction and self-determination. Theoretically, the better the learners' basic needs are satisfied, the more the self-determined motivation and self-regulated learning behavior they produce.

The authors firmly believe that autonomous learning is by definition self-determined behavior. According to SDT, when learners' behavior is controlled or regulated by specific external contingencies, they are dependent and show poor maintenance. Introjected regulation is partially internalized but still relatively external. Learners experiencing introjection are relatively dependent because there is an inner conflict between external demands of the introjection and personal reluctance to carry it out. In contrast, when identifying the values of socially sanctioned mores or requests, learners' behavior is relatively autonomous, associating with higher commitment and performance. Finally, with integration, the most complete and effective internalization, learners' extrinsically motivated actions will be fully volitional and autonomous. Based on the theoretical framework stated above, we attempted to explore a pathway to learner autonomy and to investigate how critically innate need satisfaction contributes to the development of learner autonomy, a phenomenon that has rarely been examined in previous research in EFL education. We believe that this study will extend the research on SDT and learner autonomy.

Methodology

As practitioners, the authors felt justified to employ an action research approach in this study because it allowed both the teacher and the students to identify the problem, plan an action program, carry out an intervention, evaluate the outcomes, and then develop further strategies for planning another cycle of the study during teaching and learning. The iterative four-stage process was appropriate for developing a pathway to EFL learner autonomy in this study.

Participants

The participants involved in the action research were four teachers and 65 postgraduate students majoring in engineering from two parallel classes, Class A and Class B with 32 and 33 students, respectively. The first author was the English teacher of the two classes, and the other three teachers were core members of this research project. While teaching the postgraduate students academic English, the author noticed that their English was not competent for academic study and future career development and that

they were passive or reactive EFL learners. In addition, the in-class English teaching and learning for them was very limited, only one session each week. Accordingly, to meet their academic need for English, they needed urgently to develop autonomous learning capacity and learn English autonomously. The authors had the advantage of conducting an action research during course education to find a pathway to learner autonomy.

Instruments

The instruments for this study included questionnaire, interview, proficiency test, and reflective log. All the instruments except reflective logs were used for both problem diagnosis and outcome evaluation before and after the action research.

The questionnaire consisted of three parts: psychological need satisfaction, self-regulated motivation, and learner autonomy. To ensure the validity and reliability of the data collected, the previously validated instruments: "the basic psychological need satisfaction and frustration scale" and "learning self-regulation questionnaire" were adapted, piloted, and employed in the study to measure the students' perceived satisfaction of the three psychological needs and to investigate the student participants' EFL learning motivation. The former included three subscales: need for autonomy, need for competence, and need for relatedness. Previous research has reported that each subscale measure has Cronbach's alphas above 0.80 (Chen et al. 2015). The latter consisted of just two subscales: controlled regulation (introjected and external regulation) and autonomous regulation (intrinsic motivation and identified regulation). In the past studies, the alpha reliabilities have been approximately 0.75 for controlled regulation and 0.80 for autonomous regulation (Williams and Deci 1996; Black and Deci 2000). To examine the student participants' level of learner autonomy, another five subscales (determining objectives, planning learning, applying strategies, monitoring progress, and evaluating outcomes) were designed and added to the questionnaire by the researchers according to the theory of learner autonomy. The students were required to respond to a five-point Likert scale ranging from 1 (not at all true) to 5 (very true) to indicate the degree to which the statement was true for them. Additionally, ten open-ended questions were set for both the questionnaire and the subsequent interviews. The adapted questionnaire used in the study included ten subscales, with six items for each. Results of the pre-survey were used to perform reliability analysis which produced the alpha reliability of 0.79 for the questionnaire. Most of the subscale measures had Cronbach's alphas above 0.80, except controlled regulation ($\alpha = 0.75$), monitoring progress ($\alpha = 0.72$), and evaluating outcomes ($\alpha = 0.67$).

Moreover, two International English Language Testing System (IELTS, the reliability and validity of which are good) academic papers of the same level were chosen to test the students' English proficiency and to identify their weaknesses and strengths. The IELTS papers consisted of four parts: listening, reading, writing, and speaking, but the pre-test and post-test went without speaking due to the difficulty in ensuring objective assessment of speaking. Additionally, the score of the paper was adapted to 90 with 30 for each of the three parts (listening, reading, and writing) for convenient and accurate marking.

Lastly, the teacher and the students that took part in the action research were required to keep the teaching or learning log. And three peer teachers were required to keep the observation log while observing the teaching and learning in both classes.

Procedures of the action research

The procedures of the action research cover four stages. Firstly, the pre-survey and pre-test were conducted to identify the subjects' problems and needs. Secondly, an action program for learner autonomy was developed. Thirdly, the action program was implemented in Class A for one academic year. Lastly, the post-survey and post-test were conducted to measure the outcomes.

Identifying problems and needs

First and foremost, it was vital to examine students' needs and problems, which set a direction for the action research. In September 2014, the pre-survey and pre-test were conducted among the student participants to diagnose problems in their psychological need satisfaction, learning motivation, learner autonomy, and English proficiency. Results of the pre-survey and pre-test (as shown in Tables 3, 6) revealed that the students reported moderate to their need satisfaction, learning motivation[1] (but mainly introjected regulation), and learner autonomy (but weak in self-monitoring and self-assessment), that their English proficiency was limited and especially weak in academic English, and that there was no significant difference between the two classes at this stage.

Planning an action program

Based on the students' problems and needs, a pedagogical action program for learner autonomy (APLA) was

developed, which involves five phases: setting need-satisfying objectives, co-planning teaching and learning, training strategies and skills, learning collaboratively or independently, and reflection and revision. The APLA started from satisfying needs, which was important to motivate and involve them in EFL autonomous learning within and beyond the classroom. Learners' need for autonomy was met in every phase of the APLA by encouraging them to make their own choices so as to take responsibility of their learning. Strategy and skill training satisfied their need for competence. In addition, students with common goals and objectives were encouraged to form learning groups for collaborative learning, peer monitoring, and peer assessment, which met their need for relatedness. Importantly, learners were required to keep learning logs, recording their learning progress, personal assessment, peer comments, feedback from the teacher, and so on, which provided sufficient evidences for them to reflect on their learning and to revise their learning plan and strategies.

Implementing the action program

The APLA was implemented in Class A, one of the two homogeneous classes, for one academic year. However, EFL teaching for Class B (the comparison group) just followed the course syllabus, focusing on knowledge of and cognitive strategies for academic English. In this way, the effectiveness of the APLA could be evaluated convincingly by comparing the progress of the two classes at the end of the action research. To carry out the APLA effectively, specific teaching and learning plans on different topics were made after an interactive discussion and negotiation among the teacher and the students in Class A. The teaching and learning plan covered five components: time arrangement, objective and content, activities within classroom, activities beyond classroom, and reflection and revision. Table 2 shows an example of the teaching and learning plan in the action research.

Evaluation of the outcomes

The outcomes of the action research were evaluated by comparing and analyzing the collected data: (1) students' perceived change in satisfaction of psychological needs, learning motivation, and learner autonomy via the pre-survey and post-survey; (2) evidences gathered from the interviews and open-ended questions; (3) the progress in English proficiency of the two classes via the pre-test and post-test; and (4) the supporting evidences from the observation log, the teaching log, and the learning log which were done during the implementation of the APLA. The qualitative data sources such as the interviews and journals were collected and coded in simple formats (Tables 6, 8) by

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[1] To match general learning motivation with 5-point Likert scale, 1 to 5 was, respectively, defined as amotivation, external regulation, introjected regulation, identified regulation, and intrinsic motivation.

Table 2 The teaching and learning plan for academic reading

Date	Week 3, 23rd September, 2014
Objective and content	Skills for academic reading; strategies for monitoring and assessment
Activities within classroom	T introduces characteristics of academic articles and instructs skills for academic reading and strategies for self-monitoring and self-assessment
	Ss apply the skills and strategies in academic reading practice with partners
	Ss report peer work and T gives open-class feedback
Activities beyond classroom	Individual work: Ss follow personal reading plan, do academic reading, and assess reading comprehension by answering related questions and writing the gist of the article individually
	Group work: group members gather physically or online to discuss the article, to share personal ideas, and also to monitor and assess each other's progress. More importantly, group members prepare a learning outcome presentation in the next teaching session
Reflection and revision	Based on personal assessment, peer comments, and T's feedback, Ss reflect on personal academic reading experience, evaluate personal strengths and weaknesses, and then adapt reading plan and strategies. This information is recorded in personal learning journal

T teacher, *Ss* students

Table 3 Results of the questionnaire

Subscales	Mean & SD of Class A					Mean & SD of Class B				
	Pre-*M*	SD	Post-*M*	SD	*d*	Pre-*M*	SD	Post-*M*	SD	*d*
Need for autonomy	3.21	0.621	4.24	0.356	1.44	3.25	0.612	3.84	0.584	0.7
Need for competence	3.23	0.521	4.33	0.428	1.63	3.17	0.657	4.08	0.533	1.08
Need for relatedness	3.93	0.553	4.67	0.389	1.09	3.87	0.599	3.91	0.584	0.05
Auto motivation	3.44	0.550	4.37	0.421	1.34	3.47	0.749	3.62	0.755	0.14
Ctrl motivation	3.13	0.660	2.54	0.509	−0.7	3.09	0.805	3.01	0.817	−0.1
Setting objective	3.39	0.618	4.18	0.532	0.97	3.41	0.674	3.71	0.691	0.31
Planning learning	3.07	0.566	4.02	0.347	1.43	3.05	0.591	3.06	0.627	0.01
Applying strategies	3.18	0.517	4.23	0.307	1.75	3.23	0.545	3.77	0.548	0.7
Self-monitoring	2.82	0.576	3.45	0.483	0.84	2.86	0.603	2.93	0.556	0.09
Self-assessment	2.13	0.751	3.07	0.548	1.01	2.09	0.764	2.08	0.639	−0.01

Pre-*M* mean of pre-measure; Post-*M* mean of post-measure; *d* = *Cohen's d; Auto* autonomous; *Ctrl* controlled

transcribing the convincing, shared, or common opinions from each kind of data source, respectively.

Results

This study has yielded a rich set of data that has provided valuable insights into the perception and practices of fostering learner autonomy. The integrated results basically manifested that the satisfaction of learners' innate needs facilitated them to move along the "learner autonomy continuum" gradually.

Results of the surveys

To analyze and probe the results fully, data collected from both the pre-survey and the post-survey via the questionnaire were processed using SPSS to perform preliminary analysis and multivariate analysis of variance (MANOVA).

Preliminary analysis

Two sets of data collected from the questionnaire were listed and compared between Class A and Class B as follows (Table 3).

Table 3 shows the mean, standard deviation (SD), and Cohen's *d* of each subscale of the surveys for both Class A and Class B, indicating change in the students' perceived need satisfaction, learning motivation, and EFL learner autonomy before and after the implementation of the APLA in Class A. Obviously, the pre-survey's mean of both classes was medium and quite similar, but there was quite a large gap between the mean of two classes in the post-survey. Cohen's *d* suggested that Class A had much stronger effect than Class B. Moreover, the post-measure SD of Class A decreased more than that of Class B, signifying that the implementation of the APLA facilitated an overall progress in learner autonomy along with need satisfaction and motivation in Class A. However, Cohen's *d* of

Table 4 Results of homogeneity tests

Dependent factor	Box's M test		Levene's test	
	F	Sig.	*F*	Sig.
Need satisfaction	0.292	0.831	0.148	0.701
Learning motivation	0.067	0.796	2.59	0.110
Learner autonomy	1.170	0.319	0.054	0.948

Table 5 Results from tests of between-subject effects

Dependent factors	Pre-survey between Class A & Class B		Post-survey between Class A & Class B	
	F	Sig	*F*	Sig
Need satisfaction	0.158	0.691	62.577	0.000
Learning motivation	0.000	0.993	29.087	0.000
Learner autonomy	3.637	0.051	41.884	0.000

Class A in Table 3 also revealed a weak effect of controlled motivation ($d=-0.7$) and self-monitoring ($d=0.84$).

MANOVA

To confirm the working concept of "learner autonomy continuum," concerning the positive link between need satisfaction, learning motivation, and learner autonomy, three composite variables (satisfaction of three needs, two types of learning motivation, and five subscales of learner autonomy) were submitted to MANOVA for homogeneity tests and main effects tests.

Homogeneity tests Data collected from the pre-survey were used for homogeneity tests between Class A and Class

B. The between-subject MANOVA was performed on three dependent factors (three composite variables): need satisfaction, learning motivation, and learner autonomy. Using an alpha level of 0.05 to evaluate homogeneity assumptions, neither Box's M test of homogeneity of covariance ($P>0.05$) nor Levene's homogeneity of variance test ($P>0.05$) was significant (see Table 4). The results indicated that Class A and Class B were homogeneous before the implementation of APLA.

Tests of between-subject effects To examine if the three composite variables were positively linked to each other and to determine how effective the APLA was, the data collected from both the pre-survey and the post-survey were submitted to MANOVA, with Group (Class A and Class B) as the fixed factor and the three composite variables and their scores as the dependent factors. Tests of between-subject effects were conducted on variables of each dependent factor one by one to examine significant differences between Class A and Class B before and after the intervention. Results of main effect tests were presented below (Table 5).

It can be seen from Table 5 that there were no significant effects of the pre-survey between Class A and Class B ($ps>0.05$), confirming that the two classes were homogeneous with respect to self-assessed need satisfaction, learning motivation, and self-directed learning. However, the main effects of the post-survey between Class A and Class B were significant ($ps=0.000<0.05$) in self-perceived need satisfaction, academic motivation, and autonomous learning. The results were in accordance with those of the preliminary analysis. That is, satisfying learners' innate needs in EFL education contributed to the developed learner autonomy.

Table 6 Data gathered from the interviews

Questions on	Pre-survey answers	Post-survey answers

1. Innate need satisfaction in EFL education	Not fully satisfied
	  follow teachers' arrangements, no other choices; but not know what to do except doing homework
	  feel bored to complete learning tasks, it is useless.
	  try to work on my own, not to bother others; but encouragement from teachers and peers will push me forward
		Better satisfied
		  make our own choices except following the teacher or the course books; present what we learn; but not sure if it helps pass exams
		  learn better with strategies
		  group work is interesting and encouraging, but it is time-consuming

2. Learning motivation	External and introjected regulation
	  learn English to pass exams, to get a better job, to study or travel abroad, to learn about world affairs, to watch international sports games, to play games
		Identified regulation
		  learn English to pass exams, to get a better job, to study or travel abroad, to learn about world affairs, to develop career. It's challenging to learn English well

3. Autonomous learning	Controlled or reactive learners
	  not hard to set a learning plan, but hard to follow it
	  lack of strong will to keep it going
	  rely on teacher's assessment
		Relative autonomous learners
		  easy to plan learning and try hard to follow --feel frustrated at little progress, then give up
		  Pair learning or group learning work better: learn and monitor together, and assess each other's progress

Data recorded in the table were from Class A, and Class B got similar answers to the pre-survey

Table 7 Comparison of pre-test and post-test

	Class A (N=32)		Class B (N=33)	
	mean	SD	mean	SD
Pre-test	53.8750	6.35145	53.0606	6.33906
Post-test	65.1250	6.27235	58.7576	8.00402

Results of the interviews

Ten open-ended questions were designed concerning the ten subscales of the questionnaire. The answers to the questions and data gathered from the follow-up interviews in both the pre-survey and the post-survey were summarized in three parts as follows (Table 6).

Data collected from the open-ended questions and the interviews (Table 6) were almost in line with the results of the questionnaires. Most students from Class A confirmed that their psychological needs were better satisfied while implementing the APLA, which motivated them to learn actively. They emphasized that skills and strategies for EFL autonomous learning empowered them to learn effectively. They enjoyed collaborative learning that made tedious work interesting and productive. On the other hand, the students in Class B (the comparison group) were happy to tell that they gained knowledge of academic English and mastered some cognitive strategies for academic English learning, but they felt bored and depressed when talking about autonomous learning. Noteworthily, quite a few students from both classes admitted that EFL learning was both an academic need and somewhat a burden for them, and that they did it for an instrumental purpose. Moreover, they neither attached much importance to self-monitoring nor bothered to do it due to the reactive educational culture they had been used to.

Results of proficiency tests

The results of the pre-test were used to perform independent-samples T test, with the mean values of 53.8750 and 53.0606 for Class A and Class B, respectively, $F=0.278$, $t=0.521$, $p=0.604>0.05$, $ES=0.128$, justifying that the difference between the two classes was not significant,

which indicated that the two groups were homogeneous with similar English proficiency.

The results of the pre-test and post-test for the two groups were listed and compared below (Table 7). Comparing the mean values of the pre-test and post-test, we can see that Class A made greater progress than Class B after one academic year's study. It was also worth noting that SD of the two classes moved in opposite ways, indicating that individual difference in English proficiency reduced in Class A, but increased in Class B.

Congruously, independent-samples T test of the post-test of two groups also proved that the difference in progress between the two groups was significant, $F=1.324$, $t=3.306$, $p=0.002<0.05$, $ES=0.892$. Moreover, ANOVA was conducted on the results of the pre-test and post-test between the two groups, respectively. Results of ANOVA suggested that the progress of Class A was significant, $F(1, 62)=44.037$, $p=0.000<0.05$, and that Class B also made significant progress, $F(1, 64)=10.274$, $p=0.004<0.05$, but not as much as that of Class A. The results suggested that the level of EFL learner autonomy was positively correlated with the level of EFL proficiency.

Evidences from the journals

A simple journal format was set to guide the participants what to write in the journal. It was also convenient for the author to transcribe them. A journal contains five components: date, topic and content, positive effect, problems or weaknesses, and solution (Table 8). Data collected from the journals were transcribed into three parts. They were evidences verifying the effect of the APLA and the students' progress in learner autonomy. The following three kinds of journal provided evidences to prove the hypotheses that basic need satisfaction motivated self-regulated learning and that strategy training improved learning effectiveness and efficiency dramatically.

Evidences from peer observation

The observation journal recorded the strengths and weaknesses of teaching methods, learning activities, learners' attitudes, learning performance, and learning climate in class. The observation log showed that in the first couple

Table 8 Formats of the journals

The reflective learning journal	The reflective teaching journal	The observation journal
Date	Date	Date
Topic and content:	Topic and content	Topic and content
What I learned /benefited	What worked well	Strengths
My problems or weaknesses	What didn't work	Weaknesses
Solutions:	Revision:	Suggestion or advice:

of months there was not much difference between the two classes. Then gradually Class A became more and more active and enthusiastic in presenting collaborative learning outcomes, providing comments and assessment for classmates, while Class B was somewhat passive. The results demonstrated "significant peer effects among college students"(Lu 2014; Ha 2016). Some typical comments on Group A are quoted as follows.

> Quite a few students somewhat feel bored in strategy training, but they tend to use some strategies to do exercises effectively.
> ---- *Aileen*.

> It seems that the students are more proactive in learning what they are interested in. Obviously, the students bring their potential into full play to learn EFL when they are allowed to make their own decision and to choose what they like.
> ---- *Chris*.

> It is amazing to watch students' well-prepared and creatively-presented group work. The innovative elements and their special way of presenting often arouse laughter, and attract the fellows' attention. It seems that collaborative learning motivates students to challenge difficult learning tasks together and to do better jobs.
> ---- *Amy*.

> Recently, Class A give me a big surprise from time to time. They perform very well in cosplay, English movie dubbing, English story-telling, international sports news broadcasting, English learning skill and strategy introduction and so on. Most of the classmates and the teachers are fascinated and interact enthusiastically.
> ---- *Aileen*.

Evidences from the teaching log

What stood out from the teaching log were the students' enjoyment in collaborative learning and their progress in peer monitoring and peer assessment. At the beginning, the teacher felt quite frustrated trying to involve the students in metacognitive strategy training. The students prioritized EFL cognitive strategies, not realizing the importance of metacognitive strategies. With the help of peer teachers' observation and advice, the teacher adapted learner training methods: providing the students with choices instead of full autonomy, training learning strategies according to their weaknesses, and slipping the metacognitive strategy training into academic English course education skillfully.

Gradually, Class A enjoyed making their own choices, gained confidence due to skill and strategy training, and became more active and creative due to collaborative learning. To the teacher's surprise, the students did very well in offering reasonable, wise, and informative comments on peers' work. Nonetheless, they were still relatively weak in self-monitoring and self-assessment.

Evidences from the learning log

The students' learning logs revealed that they valued cognitive strategy training, hoping that they could learn academic English efficiently. Another outstanding point that most students mentioned was collaborative learning. They realized that teamwork provided opportunities for them to learn from each other and to tackle challenging tasks together, which yielded enthusiasm to learn. Some students claimed that independent and individual learning could be more effective, but they never enjoyed it. Moreover, the students appreciated comments and feedback from the teacher and peers, which gave them a motive to move on. Lastly and interestingly, most students cared much about examination, but they felt bored when doing exercises related to examination. Unfortunately, quite a few students felt tired of keeping the learning log, just jotting down a few words or even writing nothing.

Discussion

Discussion of main findings

Preliminary analysis revealed that the implementation of the APLA facilitated an overall progress in learner autonomy along with growth in need satisfaction and motivation among students in Class A. The finding basically confirmed the first hypothesis that satisfying learners' psychological needs for autonomy, competence, and relatedness would motivate them to regulate their learning behavior positively, which enabled them to move along the "learner autonomy continuum" gradually and to achieve their goal. MANOVA showed that the main effects of the post-survey between Class A and Class B were significant ($ps = 0.000 < 0.05$) in self-perceived need satisfaction, learning motivation, and autonomous learning, signifying that fulfilling learners' innate needs in EFL education predicted positively to improving learner autonomy. The independent-samples T test of the results of post-proficiency test obtained significant differences between the two classes, justifying that the level of EFL learner autonomy was positively correlated with the level of EFL proficiency. This finding and evidences gathered from observation journal verified the

Fig. 1 The mechanism of developing learner autonomy
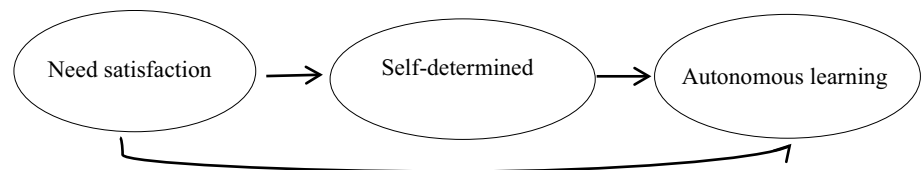
second hypothesis that equipping learners with strategies and skills would empower them to learn effectively and autonomously. Qualitative data manifested that collaborative learning played an important role in fostering learner autonomy in China.

Explanation of interesting results

However, results of preliminary analysis displayed somewhat weak effect of Class A's controlled motivation ($d = -0.7$) and self-monitoring ($d = 0.84$) (see Table 3). The findings suggested that the need-satisfying program (APLA) did not work well enough in transforming controlled motivation into autonomous motivation and promoting self-monitoring. Qualitative data confirmed the disappointing results. Researchers generally agree that the most important abilities for learner autonomy are those that allow learners to plan their own learning activities, monitor their learning progress, and evaluate their learning outcomes (Benson 2003). Acknowledgedly, self-monitoring requires autonomous (identified and intrinsic or integrative) motivation that generates high commitment and persistence. Data collected from the interviews (Table 6) explicitly explained the unexpected results. On one hand, in EFL learning environment in China, most students were instrumentally not intrinsically motivated to learn English. Therefore, even if they were trained to gain the capacity to control their own learning, they might not have strong desire to do so. On the other hand, the reactive educational culture made them get used to being monitored not self-monitoring. Briefly, the students' fair desire and ability for self-monitoring resulted from their controlled or instrumental motivation.

Mechanism of learner autonomy continuum

In this study, quantitative and qualitative data supported each other to illustrate the dynamic mechanism of cultivating autonomous learners (Fig. 1). When the APLA was implemented in Class A, the students' basic needs for autonomy, competence, and relatedness were better satisfied, and their motivation and learning behavior became more self-determined. Consequently, their behavioral regulation changed from introjection into identification. At the same time, they were motivated and empowered to move along the "learner autonomy continuum" progressively from relative dependence towards relative autonomy. In other words, the process of meeting learners' needs for autonomy, competence, and relatedness was to equip learners with necessary prerequisites to learner autonomy. Self-regulated and autonomous learning contributed to better academic achievement (EFL proficiency). Results of this action research supported the dynamic link between need satisfaction and learner autonomy in the learner autonomy continuum. In short, learner autonomy could be fostered and developed by satisfying their innate psychological needs in EFL course education.

Generally, results of this study were compatible with the findings of relevant researches (Deci and Ryan 1985, 2000; Deci et al. 1996; Ryan and Deci 2006; etc.) that satisfying learners' psychological needs for autonomy, competence, and relatedness contributed to self-determined motivation. This study proved that "interactive and collaborative learning could effectively stimulate learning motivation" (Lantolf 2000) and that students with higher motivational orientations performed better in the collaborative e-learning environment (Zhu et al. 2009). Badri et al. (2014) claimed that the fulfillment of basic needs and intrinsic motivation had a positive effect on academic achievement. Black and Deci's (2000) study argued that students' perceptions of autonomy support from their instructors predicted increases in self-regulation, perceived confidence in the subject, and a decrease in anxiety regarding a course grade. Some researchers (Ushioda 2006; Hua 2009) proposed that self-determined motivation was closely related to learner autonomy. Little (2000), Wang (2002), and Mozzon-McPherson and Dantec (2006) stressed the importance of strategy training in developing learner autonomy and improving academic achievement. Green-Demers and Pelletier (2003) found that when peers and teachers fostered relatedness through providing affiliation and interpersonal support, students were more engaged in and committed to academic endeavors, which in turn enhanced their overall well-being. Conversely, Legault et al. (2006) demonstrated that a lack of interpersonal support was significantly associated with motivational issues such as having difficulty in internalizing the importance of academic activities, having trouble in developing and sustaining motivation at school.

Conclusion and implication

The present study revealed two findings: (1) satisfaction of learners' innate needs contributed to the development of learner autonomy in EFL course education; (2) factors such as cultural background, instrumental motivation, and educational culture had an influence on fostering learner autonomy. The findings extended the research on SDT and learner autonomy by setting a link between them in the "learner autonomy continuum."

Conclusion

The present study employed an action research approach to confirm the working concept of "learner autonomy continuum," concerning the positive link between need satisfaction, learning motivation, and learner autonomy. The outcomes of the action research showed that after integrating the need-satisfying action program (the APLA) in English course education for one academic year, the students' basic needs were much better satisfied. At the same time, they were better motivated to regulate their learning behaviors autonomously. As a result, their academic English proficiency improved with the progress of self-regulated learning. Generally, the students' progress in learner autonomy was consistent with the fulfillment of their innate needs, indicating that the APLA set an effective pathway to fostering and improving learners' ability of autonomous learning, whereas the weak effect of controlled motivation and self-monitoring should not be ignored. Qualitative data sources (interviews and journals) not only provided evidences to support the main results of the present study, but also accounted for the unexpected finding.

Implications

This study implied that the factors such as cultural background, instrumental motivation, and educational culture had a notable effect on fostering learner autonomy. Many Chinese students enjoyed teamwork in EFL autonomous learning due to collectivist culture. Collaborative learning provided them with opportunities to challenge difficult tasks together, to support and encourage each other, to create an interactive learning climate, and to form a positive attitude towards EFL autonomous learning. In other words, autonomous learning is by definition self-determined behavior, but "autonomy" by no means refers to individuals' inner control or helplessness (Deci et al. 1999). Additionally, implementation of the APLA for one year did not yield as much effect on controlled motivation and self-monitoring as on the others, suggesting a strong link between these two factors and the difficulty in translating

instrumental motivation into integrative motivation in EFL learning environment. Last but importantly, the students neither attached much importance to metacognitive strategies for autonomous learning, nor to self-monitoring since they had been used to the reactive educational culture. In brief, cultural factors and instrumental motivation had noticeable influence on the applied study on SDT in education (Hu 2016) and learner autonomy.

Obviously, this study had some limitations. Since the sample in this study was limited in number and scope, repetition of research with other groups of EFL learners is strongly recommended to increase generalizability of the findings of this study. In addition, one academic year's intervention was not enough to precisely examine the causal relationship between need satisfaction and learner autonomy. Given more time, the action program would be carried out a few more rounds to obtain more evidences or more convincing results. Furthermore, a comparative study on developing learner autonomy in different cultures or among learners with different cultural backgrounds could be conducted to contrast the causal effect of cultural factors on learner autonomy. As a result, both EFL practitioners and learners would benefit from the comprehensive research outcomes.

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