Original Article

Promoting language learner autonomy through portfolio-based instruction: A classroom experiment

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The present study employs a quasi-experimental design to investigate the effectiveness of portfolio-based instruction in facilitating secondary school language learner autonomy. Specifically, this study aims to answer the following two research questions: (1) Does portfolio-based instruction for out-of-class learning promote students' autonomous attitudes? (2) Does portfolio-based instruction encourage them to put out-of-class learning into practice? The participants were 58 first-year junior high school students (treatment group, n = 28; control group, n = 30). Autonomous attitudes were assessed using the Autonomy Diagnosis Scale pre- and post-test. Portfolio-based instruction was conducted for three weeks, only for the treatment group. The results showed that while the instruction had a positive impact on the learners' *perceived* autonomous attitudes, especially in their cognitive processes, their effects on out-of-class study (i.e., *actual* autonomous behavior) varied remarkably among students. Based on the overall results, the study provides the educational implications and directions for future research.

Keywords: **learner autonomy, out-of-class learning, portfolio-based instruction, secondary school students, self-directed learning**

Introduction

The Ministry of Education, Culture, Sports, Science and Technology (MEXT) highlights the importance of "fostering a spirit of autonomy" in the Basic Act on Education (MEXT, 2006). The newly revised national curriculum standards present three competencies to cultivate a child's ability: (1) knowledge and skills; (2) the ability to think, judge, and express; and (3) an attitude towards learning and the ability to relate to others (MEXT, 2017). These ideas underlie the slogan "Zest For Life," which is the title of the course for elementary and secondary school education (MEXT, 2019). Ozeki (2010) claimed that "Zest For Life" matches the definitions of autonomous learners; that is, learners with metacognitive knowledge set their own goals, use appropriate strategies, solve problems, and implement tasks. In order to promote these skills in learners, encouraging self-directed, out-of-class learning could be a possible approach. Benson (2011) pointed out that the term "out-of-class learning" has been used to mention activities that supplement classroom learning, including homework, extra-curricular activities, self-instructional materials, and other engagements ordinarily initiated by students (pp. 138–139). In this study, we define out-of-class learning as students' self-initiated and self-directed English language learning outside of class, which excludes learning with professional assistants, such as cram school instructors and tutors.

At present, it seems that Japanese school learners will often complete assigned homework, but some of them will not perform additional studies. According to research by the Benesse Educational Research and Development Institute (2015), 67% of junior high school students in Japan felt unsure about the methods of study at home. Moreover, some students were uncertain about how to study once they entered university—they did not know how to direct their own learning (Yamashita, 2015). They might not have had enough opportunities to regulate their own learning in their secondary school lives.

The Foreign Service Institute (FSI) of the U.S. Department of State estimates that approximately 2,200 class hours are required for an English speaker to obtain an intermediate level of knowledge (roughly equivalent to B1 according to the CEFR; Council of Europe, 2001) of a foreign language that is typologically different (e.g., Japanese) (U.S. Department of State, n.d.). This is also true for Japanese people who learn English. Since the total number of hours of English classes in a regular public secondary school in Japan is much smaller than 2,200 hours, learners would need to independently create additional study time. Out-of-class learning would be ideal because it would increase study time and provide opportunities for self-directed learning, which could develop learner autonomy.

Assessing Learner Autonomy

Language learner autonomy is a multi-dimensional capacity that takes different forms for different

learners at different times in different situations (Benson, 1997, 2011; Little, 1991). Even though previous researchers used the term "learner autonomy," they tended to focus on different dimensions of autonomy in actual studies. For example, some researchers have focused on autonomy's cognitive aspects (e.g., ability, capacity, skill), others on affective aspects (e.g., attitude, readiness, self-confidence), and still others on metacognitive aspects (e.g., setting goals, planning learning activities, monitoring learning progress). This classification itself is beneficial in terms of ensuring diversity of learner autonomy research, but it also makes it difficult to share actual images of autonomous learners among different researchers or educators.

Under these circumstances, Benson (2011) argued that autonomy's multidimensional aspects must be included in any definition. He defined language learners' autonomy as "the capacity to take control over one's own learning" (p. 58), and categorized autonomy's multidimensional capacities in three: learning management, cognitive processes, and learning content. Even though learner autonomy is a complex matter (Everhard, 2015) and it is not a single, easily describable behavior (Little, 1991), Benson (2011) claimed that aspects of autonomy should be measured for two reasons. First, aspects of autonomy must be observable phenomena to create validity, since this allows autonomy to be researchable. Second, programs or innovations for fostering learner autonomy would be more effective if educators mutually agree on, and clearly understand, the concept of autonomy. He also suggested that aspects of autonomy should be described in a large variety of forms, and that appropriate forms should be chosen according to the researchers' recommendations (Benson, 2011). Using this framework enables us to examine the three aspects of learner autonomy, which have hitherto been separately studied, from a holistic perspective.

Based on the above arguments, Hiromori (2019a, 2019b) developed an Autonomy Diagnosis Scale (ADS) to measure the multidimensional aspects of learner autonomy. The instrument assesses learning behavior by investigating the three aspects of learner autonomy which evolved from Benson's (2011) operationalization. An exploratory and confirmatory factor analysis of Japanese secondary school learners' responses created an instrument with robust psychometric properties. In addition, the preliminary investigation also demonstrated that the mean scores of third-year junior high school students in all three aspects were significantly *lower* than those of first-year students. This implies that the learner autonomy of junior high school students does not develop in parallel with their academic capacity in their natural school context. We need to intentionally promote autonomy.

Promoting Learner Autonomy

According to Benson (2011), learner-based approaches aim to enable learners take greater control over their learning by providing them with opportunities for self-directed learning. Some studies employing learner-based approaches have introduced programs that combine explicit instruction on strategies and learning reflections. For example, Stoeger and Ziegler (2011) implemented self-regulated instruction for fourth-grade elementary school children using their mathematics homework. In the first week of the six-week intervention, participants were informed about the learning processes and strategies. In the second week, they were given homework, quiz, and self-observation sheets to monitor their out-of-class learning and strategy use. After the third week, they reflected on the outcomes of their strategy use and modified their strategies to improve out-of-class learning. The results showed that children who received training improved in time management, study skills, self-regulation, metacognitive competencies, and motivation.

Self-regulation is a personal feedback loop (Zimmerman & Moylan, 2009) that consists of three levels: forethought, performance, and self-reflection (Schunk & Zimmerman, 1998; Zimmerman & Moylan, 2009). According to Schunk and Zimmerman (1998), expert self-regulated learners have particular strategies for each phase. For example, in the forethought phase, they build images of their learning goals by taking small concrete steps that lead to a bigger goal. In the performance phase, they monitor and control themselves to concentrate on learning. This is followed by the self-reflection phase, where they review their progress. When they reach another forethought phase, learners adopt or modify their strategies thereby achieving high self-efficacy. Zimmerman and Moylan (2009) mentioned that quite a few studies on self-regulated learning focused on students' use of metacognition, such as strategy use

and self-monitoring. To promote their self-monitoring skills, Anderson (2008) recommended the use of journals by students. Reading through their own writings enhances students' self-reflective thoughts (Mineishi, 2010).

Portfolios are usually defined as "purposeful collections of students' work" (Apple & Shimo, 2004; Genesee & Upshur, 1996). The optical and repetitive quality of portfolios can be used to help students monitor out-of-class learning. The benefits of maintaining portfolios are reflection, documentation, and collaboration (Zubizarreta, 2009). With regard to collaboration, Little, Dam, and Legenhausen (2017) suggested using posters in combination with portfolios to create a collaborative learning process that helps students create a work cycle.

According to Benson (2011, p. 186), teachers help students' autonomous learning as they (1) "plan and carry out their independent language learning," (2) "evaluate themselves," and (3) "acquire the skills and knowledge needed to implement the above." This idea shares some key words with the self-regulated feedback loop mentioned above (e.g., plan, carry out, and evaluate or reflect). Self-regulated practices that take such steps may lead students to "take control over one's own learning" as active autonomous learners for the entire learning process. That is, teachers can foster student autonomy by enhancing their feedback loop of self-regulated learning. In addition, the use of portfolios would highlight their feedback loop as well.

Based on the findings and discussions summarized so far, we devised the following two research questions: (1) Does portfolio-based instruction for out-of-class learning promote students' autonomous attitudes? (2) Does portfolio-based instruction encourage them to put out-of-class learning into practice?

Method

RQ1 was investigated through pre- and post-test designs with a treatment and a control group. For the intervention with the treatment group, portfolio-based instruction was conducted for three weeks. Collaborative class discussions and posters were utilized to amplify the potential of the portfolios. For RQ2, we calculated the treatment group's out-of-class study time during the intervention.

Participants

The participants were 58 first-year junior high school students drawn from two intact classes. Classes were randomly assigned to either the treatment group (n = 28) or the control group (n = 30). First-year students (aged 12 to 13) were chosen for the study because they were at the beginning of secondary education and would therefore have more chances to develop their own out-of-class learning management skills after the intervention. Given the possibility that the participants might not truthfully answer the questions, but choose the responses that seem socially favored, they were told that their responses would not affect their grades.

Teaching Materials

Three types of teaching materials (portfolio worksheets) were prepared: (1) Reflection worksheets were created to help participants introspect on their habits related to out-of-class learning. The treatment group was encouraged to engage in such reflection before each of the three in-class lessons. (2) Foresight worksheets were used after each class to note ideas and strategies from the classes for efficient out-of-class learning. (3) Learning management worksheets, named "Out-of-Class Learning Planner" (OCLP), were designed to facilitate participants' daily planning and reflection on their out-of-class learning.

Treatment

In-Class Activities

The treatment participants had lessons once a week, and each of the lessons dealt with one aspect of autonomy in the ADS: learning management for the first week, cognitive processes for the second, and learning content for the third. In the first class, the first author gave a short lecture to the participants, explaining that English language learners in Japan needed to study for at least 2,200 hours to learn the language. Since the participants' class hours were less than this, she added that the participants needed 270 additional minutes of out-of-class learning per week until they finished second year in college. The participants were told that using the OCLP would be helpful in securing out-of-class study time. They then received the portfolio file and OCLP sheets and were instructed to write down their out-of-class learning goals for the week (including learning content and study time).

The class in the second week covered the

concept of cognitive processes. The participants formed small groups and discussed problems that interfered with their out-of-class learning. After presenting their problems to the class, participants brainstormed solutions, wrote them on the memos, and attached them to the posters with the problem list. Posters with the notes were displayed in the corridor. During break times, the participants were encouraged to find solutions from the posters appropriate to their situations, and copy them onto the foresight worksheets.

The third week covered the concept of learning content. Participants were encouraged to reflect on their out-of-class learning for the final exam and gave themselves a percentage grade for the quality of their preparation with the reflection worksheets. In the next step, they considered what content they needed to learn and devised concrete ways of learning it. The ideas on the paper were categorized by learning content and attached to blank poster sheets. After the third class, the participants were encouraged to find supportive ideas from the posters and copy those onto the foresight worksheets.

Out-of-Class Learning Planners (OCLP)

The treatment participants were encouraged to use the OCLP daily throughout the intervention. The learning sessions were conducted four times per week during the intervention. At the beginning of each class, the teacher asked the participants to take their portfolio files and reflect on the learning content and study time of their previous out-of-class learning session. Following this, they planned the next out-of-class learning session for that evening, in the same way as before. In addition, the teacher asked the participants to write a weekend learning plan in the OCLP every Friday, and bring the files to school the next Monday. The author from the first class collected their portfolio files on the day. She wrote feedback on the participants OCLPs, using positive words and empathizing with their reflections on out-of-class learning, such as effort, ingenuity, and findings (for example, "You tried so hard this week!", "You made a wonderful study plan!", and "I think you found really useful tips for out-of-class learning."). The OCLPs with feedback were returned to participants on Monday, along with new OCLP sheets for the coming week.

Instruments

Autonomy Diagnosis Scale

The Autonomy Diagnosis Scale (ADS) was used to answer RQ1. It was originally developed in our previous studies and has been validated for its psychometric properties (Hiromori, 2019a, 2019b). The scale contains three subscales: (1) learning management (e.g., "I make it a rule to plan a study schedule"; eight items), (2) cognitive processes (e.g., "I try not to think about something unrelated to my learning in order to focus on the task at hand"; eight items), and (3) learning content (e.g., "I choose my learning content by myself"; three items). All of these items were rated on a seven-point scale, ranging from 1 (not strongly applicable) to 7 (strongly applicable).

Students' Out-of-class Learning Time

To answer RQ2, the treatment participants' total out-of-class study time was sorted by the first, second, and third week that they recorded information in their OCLP. We hypothesized that their length of study time would indicate their out-of-class learning implementation.

Analysis Procedure

On the first and last days of the intervention, the treatment and control participants took the ADS pre- and post-test during the morning classroom meeting. The tests took approximately ten minutes each. IBM SPSS Statistics 28 was used for data analysis. After the validity and reliability of the scale were confirmed, descriptive statistics were summarized for raw scale scores and change scores (i.e., from pre-test to post-test). *T*-tests were conducted to compare the change scores between the treatment and control groups. Finally, the treatment group's out-of-class study time, sorted by week, was identified to reveal whether the instruction encouraged the participants to engage in out-of-class learning.

Results and Discussion

Autonomous Attitude Changes

As a preliminary analysis, the validity and reliability of the ADS were checked. The validity of the instrument was confirmed by applying the concepts of content- and criterion-related validity. Content validity was confirmed by enlisting the advice of the teachers in the research school. They evaluated whether the content of the ADS was fit to find out about the

students' autonomous attitudes. Criterion-related validity was confirmed by examining the correlation between the treatment participants' total out-of-class study time during the intervention and their degree of autonomy (which was reflected in the ADS total score). The Pearson correlation coefficient revealed a statistically significant relationship between average out-of-class study time and the ADS pre-test and post-test scores combined (r = .55, p = .00).

As for reliability, the Cronbach's alpha and McDonald's Omega scores were calculated to obtain the value of internal consistency. The Cronbach alpha indexes in each subscale ranged from .80 to .88 in the pre-test and .67 to .89 in the post-test, while the McDonald omega indexes in each subscale ranged from .82 to .89 in the pre-test and .68 to .89 in the post-test, respectively. These results demonstrated that the ADS used in this study had adequate psychometric features, such as reliability and validity, and could be used in subsequent research.

Table 1 shows the descriptive statistics for the treatment group which experienced the portfolio-based instruction, and the control group with no such instruction. The two groups had a similar level of autonomy before the intervention (i.e., at Time 1), as the results of independent t-tests indicated that there were no statistically significant differences between the two groups (learning management: t = 0.00, p = .99; cognitive processes: t = 0.44, p = .59; learning content: t = 1.22, p = .23; ADS total: t = 0.72, p = .48).

Table 1 *Descriptive Statistics for the ADS Mean Scores of the Treatment and Control Groups on Pre-test and Post-test*

	Treatment Group (n = 28)				Control Group (n = 30)			
			95% *CI*				95% *CI*	
Variable	*M*	*SD*	*LL*	*UL*	*M*	*SD*	*LL*	*UL*
Learning Management								
Time 1	4.61	0.84	4.29	4.93	4.61	1.30	4.12	5.11
Time 2	5.04	1.04	4.65	5.44	4.86	1.22	4.39	5.32
Cognitive Processes								
Time 1	4.50	1.15	4.06	4.93	4.63	1.18	4.18	5.08
Time 2	4.93	1.32	4.43	5.43	4.62	1.39	4.09	5.15
Learning Content								
Time 1	4.47	1.27	3.99	4.95	4.94	1.65	4.31	5.57
Time 2	4.92	1.45	4.37	5.47	4.93	1.45	4.38	5.48
ADS Total								
Time 1	13.58	2.64	12.58	14.58	14.18	3.71	12.77	15.60
Time 2	14.89	3.48	13.57	16.22	14.41	3.73	12.99	15.83

Note. *M* = mean; *SD* = standard deviation; *CI* = confidence interval; *LL* = lower limit; *UL* = upper limit

To examine the effect of the portfolio-based instruction on student autonomy, t-tests were conducted with change scores as the dependent variable and treatment condition (treatment group, control group) as the independent, between-groups variable. The results in Table 2 show that the pre- and post-total change scores of the treatment group exceeded those of the control group (t = -2.61, p = .01). For cognitive processes, there was a statistically significant difference in the mean change between the two groups (t = -2.48, p = .02). This suggests that portfolio-based instruction was particularly effective in helping students to better monitor their own learning processes (e.g., forgetting things that are not relevant to the task at hand).

On the other hand, there was no statistically significant difference between the two groups in terms of learning management (t = 1.02, p = .31) and learning content (t = -1.83, p = .07). As for the former (i.e., learning management), while the treatment group participants used the OCLP in the portfolio, the control group participants also used a similar worksheet distributed to all students to prepare for the exam. This could be the factor that increased both groups' mean scores in learning management at the post-test. Regarding the latter (i.e., learning content), there was a relatively large difference in the change score between the two groups (M_{diff} = 0.46), and if there had been more participants, a statistically significant difference would have been confirmed.

Overall, the results suggest that the educational intervention, that included portfolio worksheets and related classroom activities, had the potential to promote autonomy in secondary school students, especially in their cognitive processes. This is good news from an educational standpoint. Namely,

in order to promote learner autonomy, if no additional interventions are provided, as in the control group, no significant changes can be expected. On the other hand, it is possible to intentionally increase learner autonomy if explicit intervention is provided, as in the treatment group.

Table 2 *Comparison of the T-tests for the ADS Mean Change Scores of the Two Conditions*

	Treatment Group (n = 28)		Control Group (n = 30)		t	p	Effect size[a]	Difference
Variable	*M*	*SD*	*M*	*SD*				
Learning Management	0.43	0.79	0.25	0.59	-1.02	.31	.02	-
Cognitive Processes	0.43	0.73	-0.01	0.63	-2.48	.02	.10	Treatment > Control
Learning Content	0.45	0.94	-0.01	0.97	-1.83	.07	.06	-
ADS Total	1.31	1.83	0.23	1.31	-2.61	.01	.11	Treatment > Control

Note. M = mean of change score; *SD* = standard deviation; [a] effect size of η^2 = .01 represents a small effect, η^2 = .06 medium effect, and η^2 = .14 large effect (Dörnyei, 2007).

Out-of-class Study Time

Table 3 shows the mean scores, and maximum and minimum values for the treatment participants' study time, sorted by the first, second, and third weeks that they recorded information in their OCLP.

Table 3 *Descriptive Statistics for the Treatment Participants' Out-of-class Study Time*

	N	*M*	*SD*	Min.	Max.
1st week	28	260.86	156.62	65	720
2nd week	28	225.82	128.42	10	510
3rd week	28	264.18	156.19	35	600

Note. M = mean; *SD* = standard deviation; Min. = minimum score of study time; Max. = maximum score of study time. The scores are expressed in minutes.

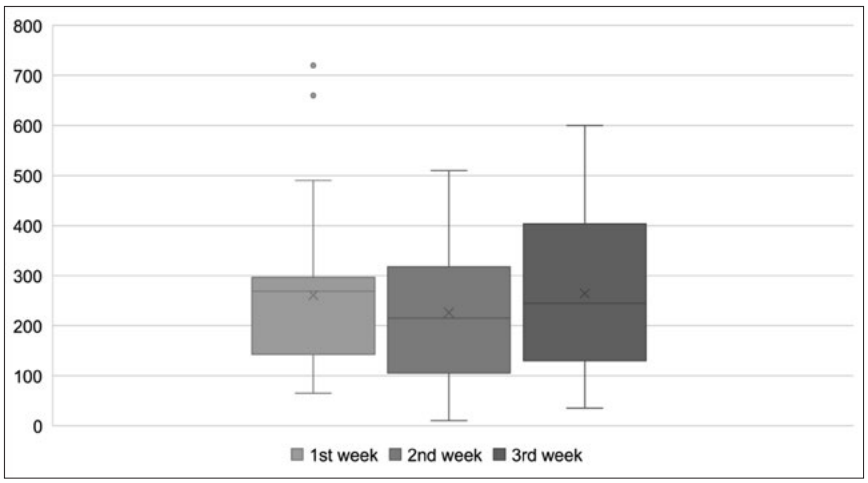

Figure 1. The box plot for the treatment participants' out-of-class study time (minutes) sorted by week.
Note. The data point located outside the whiskers of the box plot is an outlier. The middle line of the box represents the median values. The x in the box represents the mean value.

Figure 1 shows the distribution of individual study times. The substantial differences between the maximum and minimum scores indicate relatively large individual differences among the participants. To further examine these differences among treatment group participants, cluster analysis, which enabled us to classify the participants into groups (i.e., clusters) with similar characteristics, was employed. With the aid of a dendrogram (a graphic representation of the clustering process) obtained from the analysis, the treatment participants were categorized into two groups, high- (n = 19) and low-levels (n = 9), based on their ADS pre- and post-test characteristics. As for the characteristics of the two clusters, the mean scores of the three aspects of the high-level group were higher than those of the low-level group at both the pre- and

post-tests. The results of the Mann-Whitney U tests were all statistically significant ($p < .01$).

Table 4 shows the descriptive statistics for the high and low group's out-of-class study times. For the learning time difference between the high and low groups in each week, the results of the Mann-Whitney U tests showed that there were significant differences between the two groups ($p < .05$).

Table 4 *Descriptive Statistics for the High- and Low-level Group's Out-of-class Study Time*

	N	*M*	*SD*	Min.	Max.
1st week					
High-level	19	301.63	167.52	99	720
Low-level	9	174.78	85.86	65	270
2nd week					
High-level	19	261.74	132.05	10	510
Low-level	9	150	83.03	40	320
3rd week					
High-level	19	313.05	161.18	35	600
Low-level	9	169.88	79.41	74	315

Note. M = mean; *SD* = standard deviation; Min. = minimum score of study time; Max. = maximum score of study time. The scores are expressed in minutes.

The two groups of treatment participants had different features not only in the three aspects of autonomy in the ADS, but also in their out-of-class study time during the intervention. While all participants were encouraged to do more than 270 minutes of out-of-class learning per week during the intervention, the ADS high-level group tended to achieve higher study minutes. This is deemed to reflect students' autonomy development through the intervention. However, as can be seen in the size of SD and minimum value in Table 4, there were large individual differences in the high-level group.

There could be various reasons for the result, but one may be their writing skills; some of the participants, especially those in the low-level group, did not write their plans and reflections concretely and often left sections blank in their OCLP. Moreover, there were some participants who were not good at describing their ideas in writing; writing is only one way of producing output. Those students would need support by providing more accessible ways to relay their thoughts. Although the intervention in this study aimed to promote each student's autonomy in the same way, some students needed alternative methods or additional individual guidance.

Conclusion

The study has some limitations. First, the intervention period was limited to three weeks. Although this study indicates the effectiveness of the three-week portfolio-based instruction for enhancing learner autonomy, it would not be easy to stabilize it only in three weeks. Second, this study aimed to increase students' out-of-class learning by focusing on the length of the study time, but it did not cover whether the time was concentrated learning time.

This study was conducted to promote Japanese junior high school students' autonomy by encouraging the management of their out-of-class learning. Portfolio-based instruction was used to increase the treatment participants' out-of-class study time. The portfolios, which contained OCLP and several reflection and foresight sheets, helped the participants experience learning cycles with planning and reflection. The participants had opportunities to think about their out-of-class learning in more depth through the three-week intervention. The results showed that the intervention had the potential to promote students' autonomy, especially in their cognitive processes. The components of cognitive processes in the ADS include selective attention, emotional control, motivation control, and coping with failure (Benson, 2011). Schools should instruct students on strategies for cognitive processes when introducing study planners.

In addition, portfolio-based instruction encouraged treatment participants to achieve their targeted study minutes each week, while some of the participants could not achieve this goal. This suggests that some students need extra help to describe their thoughts to increase their out-of-class study time.

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要旨

本研究では準実験的なデザインを用い、中学校の言語学習者のオートノミーを促進するためのポートフォリに基づいた指導の効果を調査した。具体的には、本研究は以下の2つの研究課題に答えることを目的とした。(1) ポートフォリオに基づいた指導は、授業外学習に対する生徒の自律的な態度を促進するか？ (2) ポートフォリオに基づいた指導は、生徒の実際の授業外学習を促進するか？ 参加者は、中学1年生58名（実験群：n = 28, 対照群：n = 30）であった。彼らの自律的な態度は、自律性診断尺度を用いた事前・事後テストで評価された。ポートフォリオに基づいた指導は、実験群の生徒に対してのみ3週間行われた。その結果、全体として学習者の自律的な態度、とりわけ認知プロセスには肯定的な変化が見られたものの、授業外の学習時間（＝実際の自律的行動）に対する影響は、学習者によって著しく異なることが明らかとなった。これらの結果を踏まえて、教育上の意義と今後の研究の方向性を示した。

キーワード：学習者自律、授業外学習、ポートフォリオに基づいた指導、中学・高校生、自主学習

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