Changes in Metacognitive Strategy Use by Nursing Students During the COVID-19 Crisis

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COVID-19禍における看護学生のメタ認知方略 －1年後の変化－

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Abstract

Students have been adversely affected by the COVID-19 pandemic and have been learning online since 2020. This questionnaire-based study aimed to clarify the changes in metacognitive knowledge among first-year nursing students at a university in western Japan in the period 2020–21. Two surveys were conducted at an interval of one year with the same questionnaire, containing 23 questions related to knowledge of metacognitive strategies; the 2021 survey included an additional open-ended question, "What did you feel was most difficult in your learning?" After completing the 2021 survey, changes in metacognitive knowledge were analyzed using a t-test. The results showed that the students had similar responses to both surveys, except for "I know my strengths and weaknesses in learning." Responses to the open-ended question, "What did you feel was the most difficult in your learning?" included "Learning environment," "Physical and mental Strain," "Learning attitude," and "Self-restraint." Post-COVID-19 learning will thus depend largely on the foundation that teachers and administrators establish during the pandemic.

Key words: university, nursing students, metacognitive strategy, COVID-19, digital/online learning

要旨

2020年度からCOVID-19の影響を受け，学生はオンライン授業を主とした学習環境で学習を継続している．本研究は，2020年度入学の西日本の4年制大学に所属する看護学生の1年後のメタ認知方略の変化を調査した．メタ認知方略の知識に関する質問23項目に追加して，2021年度の調査では「コロナ禍での学習の際に，一番辛かったこと」という自由記述

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の質問を追加した．4段階のリッカート式の質問に回答した77人は，「自分の得意不得意を知っている」を除いて，両調査の質問に対する回答に差はなかった．自由記述の内容は，＜学習環境＞＜心身への負担＞＜学習姿勢＞＜行動自粛＞に分類できた．このような結果から，COVID-19後の学習は，教員や管理者がパンデミック中に確立した基盤に大きく依存することになると考える．

キーワード：大学，看護学生，メタ認知方略，COVID-19，オンライン学習

Ⅰ. Introduction

Expectations of independent learning from university nursing students were higher during the COVID-19 pandemic. The students did not receive the same level of support as they did during face-to-face, on-campus learning, because the classes, except those involving practicum and certain experiments, were being conducted remotely. With the pandemic completely changing the learning environment and style, it was hypothesized that students were now more independent and autonomous than expected. They were expected to self-evaluate, self-monitor, and plan their own learning, which are considered to be metacognitive strategies. Metacognitive strategies are defined as learning strategies that allow learners to control their own learning (Oxford, Lavin, & Crookall, 1989).

This questionnaire-based study aimed to clarify the changes in metacognitive strategy use among first-year nursing students at a university in western Japan in the period 2020–21.

Ⅱ. Methods

Participants

All participants were nursing majors at the university nursing school, and 91 first-year students (9 men and 82 women) aged 18–19 years participated in this study. They were asked to respond to the questionnaire twice, in May, 2020 and in May, 2021. The researchers were three professors at the university and were in charge of the course language, cross-cultural education, and global health studies. At the time of data collection, the university decided to conduct all related classes online, except those involving practicum and seminars. A request to complete the questionnaire was sent to the participants at the beginning of the 2020 academic year.

Instrumentation

During both surveys, the same questionnaire was administered, which had questions on knowledge and perceptions of metacognition. Twenty-three items were chosen based on the results of previous studies. The participants responded on a Likert-type scale ranging from 1 (strongly disagree) to 4 (strongly agree), with an opt-out option for each item. The questionnaire was linked to the university chat platform. For the second survey, an open-ended question about the aspect the participants found to be most difficult in online learning was added.

Data Analysis

A *t*-test was used to compare the means of the metacognitive strategy scores between the surveys in 2020 and 2021. IBM SPSS version 26.0 was used for data analysis. For the answers to the open-ended question, keywords in the text were extracted and categorized.

Ethical considerations

The survey was approved by the ethics committee of the university (No. 2019-N15). An explanation and description of the survey that explained their rights were sent to the participants in advance. Furthermore, it was confirmed that the survey posed no risks and caused no discomfort to the participants.

Ⅲ. Results

Demographic data

Demographic data were obtained using descriptive statistics (Table 1).

Table 1
Demographic Data

Year		2020	2021
Participant		99	99
Respondent		84	77
Gender	**Male**	5	6
	Female	79	71

Students' metacognitive strategies

The results of the 2020 survey (response rate: 84%) showed that the students strongly agreed with items regarding the "effectiveness of strategy use," "knowing oneself," "human mentality," and "problem-solving ability"; thus, implying their

Table 2
Items Regarding the Use of Metacognitive Strategy

		2020		2021				
		M	SD	M	SD	t-test	p	
1	I know my strengths and weaknesses in learning.	3.14	.47	2.88	.63	2.989	.003	**
2	I know and understand the elements that are important for effective learning.	2.63	.56	2.53	.72	.978	.329	
3	I know how much I can memorize.	3.05	.58	2.88	.76	1.552	.123	
4	I know how much I can understand.	2.96	.59	2.83	.66	1.354	.178	
5	I ascribe my failure to bad luck. (Inverted item)	2.02	.60	2.16	.69	1.298	.196	
6	I tend to accept somebody's invitation when he/she knows my weakness.	2.82	.64	2.78	.72	.393	.695	
7	I tend to build up to increasingly demanding material and tasks gradually.	3.01	.63	2.90	.74	1.075	.284	
8	At the moment, I feel I have many advantages.	3.24	.59	3.10	.68	1.336	.183	
9	I have difficulty conveying my intentions effectively when typing on a computer. (Inverted item)	2.54	.88	2.75	.83	1.606	.110	
10	I have difficulty conveying my intentions effectively in written form compared to in spoken form.	3.27	.67	3.21	.68	.625	.533	
11	I carelessly dial wrong numbers. (Inverted item)	2.74	.76	2.52	.85	1.718	.088	
12	I tend not to forget new information if I learn it in the context of multiple familiar topics.	3.17	.58	3.18	.62	.160	.873	
13	I can concentrate on the cooking program on TV if I know I can find the recipe on the Internet.	2.76	.74	2.74	.73	.186	.852	
14	I feel that too many cooks in a group discussion make the dish dull.	2.99	.77	2.87	.70	1.019	.310	
15	When I take breaks during sports, I achieve more effective performance.	3.29	.79	3.29	.72	0.000	1.000	
16	I prefer researching new information by reading books rather than by browsing the Internet.	2.95	.69	2.82	0.70	1.220	.224	
17	While studying, I purposely arrange items randomly to increase the difficulty level.	2.76	.77	2.84	0.75	.688	.493	
18	When I encounter an unfamiliar problem, I refer to a similar problem in my memory and apply the same solution to the new problem.	3.14	.62	3.00	0.61	1.471	.143	
19	I answer easier questions first on timed tests.	3.56	.55	3.44	0.66	1.241	.216	
20	When I want to understand a technical term fully, I explore all the concepts it is associated with.	3.54	.50	3.44	0.60	1.088	.278	
21	When I prepare for an interview, I try to anticipate the questions and answers I will be asked and the answers I will give.	3.52	.67	3.53	0.62	.085	.932	
22	Before I go to a place, I confirm the location on a map even if I remember where it is.	3.26	.68	3.06	0.66	1.869	.063	
23	I focus on the discussion rather than on taking notes.	1.75	.56	1.92	0.70	1.729	.086	

**p < .01

capability to learn independently. After completing the 2021 survey (response rate: 77%), changes in metacognitive knowledge were analyzed using a *t*-test. The results showed that the students had similar responses to both surveys, except for the question "I know my strengths and weaknesses in learning." Although the effect size was low, the students expressed significantly lower agreement with this question in the 2021 survey ($M = 2.88$, $SD = .63$) than in the 2020 survey ($M = 3.14$; $SD = .47$; $t(159) = 2.989$, $p = .003$, Cohen's $d = .47$] (Table 2).

The open-ended question

Responses to the open-ended question, "What did you feel was most difficult in your learning?" The results of the content analysis revealed four categories: "Learning Environment," "Physical and mental strain," "Learning attitude," and "Self- restraint" (Table 3).

Ⅳ. Discussion

The results revealed that the students might have faced difficulties in learning online, as it was a new experience for them. The decrease in the item "I know my strengths and weaknesses in learning" revealed that the learning style, which was completely different from that in their high school days, might have puzzled them. At the time of the second data collection, they might not have been able to recognize their own strengths and weaknesses in learning. In addition, the pandemic context, in which online learning started, made things worse. Anthonysamy (2021) conducted a study related to metacognitive strategy use during the pandemic and called this learning environment a challenging aspect. Her study found that the students were suddenly tasked with much greater learning responsibilities. However, they were unaware of the ways to examine their learning styles and judge effective methods.

The changes observed in nursing students' perceptions during the COVID-19 crisis may help identify new directions for higher education. Future research should focus on effective ways to increase students' self-reflection, self-control, and strategy planning in learning. Therefore, it is essential to develop an ideal

Table 3

Responses to the Open-ended Question

CATEGORY	Sub-Category		Description
Learning environment	Relationship with teachers	25	I hesitated to ask questions to the teacher. There were a lot of assignments.
	Teaching method	19	I was sorry it was not a face-to face class. I was not able to attend the on-site practicum.
	Relationship with peers	14	I was not able to share information with my peers. I was not able to make friends.
	Teaching materials	4	It was tough to print out all the learning materials at home.
Physical and mental strain		12	My eyes hurt because I had to look at the screen for a long time. I felt anxious because I was not used to having a class online.
Learning attitude		10	I had difficulty keeping my concentration. I had difficulty creating a classroom setting at home.
Self- restraint		3	I was asked to refrain from going outside.

learning environment. Post-COVID-19 learning will thus depend largely on the foundation that teachers and administrators establish during the pandemic, including the creation of environments encouraging students to nurture their self-learning abilities.

References

Anthonysamy, L. (2021). The use of metacognitive strategies for undisrupted online learning: Preparing university students in the age of pandemic. *Education and Information Technologies.* Retrieved from https://doi.org/10.1007/s10639-021-10518-y

Oxford, R., Lavin, R. Z., & Crookall, D. (1989). Language learning strategies, the communicative approach, and their classroom implication. *Foreign Language Annals, 22*, 29-39.

Takahashi, S., et al. (2017). Report on 2016 Okayama Prefectural University students' beliefs in learning English. *Bulletin of Higher Education and Liberal Arts and Sciences Research, Okayama Prefectural University, 1*, (1), 33-40.

Takahashi, S., et al. (2019). Developmental proposal of the English curriculum at Okayama Prefectural University based on the present curriculum and first-year students' beliefs regarding English learning. *Bulletin of Higher Education and Liberal Arts and Sciences Research, Okayama Prefectural University, 3*, (1), 1.1-1.8.

Takahashi, S., & Yamaguchi, M. (2020). Relationship between Japanese students' knowledge about smoking and metacognitive strategies. *Journal of Graduate School of Nursing Science Himeji University, 3*, 45-53.