IMS-LMS: A Learning Management System Integrated with Idea-Marathon System Activities

Motoki Miura and Takeo Higuchi

Abstract— The Idea-Marathon System (IMS) is a creativity training method by thinking and writing about thoughts and ideas every day. Even though the basic activity of IMS is simple, but it is difficult for students to get into the habit. To relief the difficulty, we have developed IMS-LMS, an LMS that incorporates IMS activity. Since LMS is used on a daily basis, it has a high affinity with the IMS activity. By applying IMS-LMS to lecture courses for freshmen, we were able to confirm that there was a weak positive correlation between LMS access, cumulative ideas, and student scores. The content of the lecture had little to do with idea generation and creative thinking, but 50% of students succeeded in developing the habit of continuing the idea marathon.

Index Terms—The Idea-Marathon System (IMS), Creativity, Education for Freshmen, Motivation, Web-based LMS

I. INTRODUCTION

THE purpose of this study is to practically examine how the Idea-Marathon System incorporated with LMS (learning management system) facilitates the task of habituating idea generation for university freshmen.

The Idea-Marathon System [1] (IMS) is a creativity training method founded by the second author in 1984. The basic activity of IMS is to think about thoughts and ideas every day, and to write them into A5-sized notebook with cumulative number of ideas. Even though the basic activity is simple, but it is difficult for students to get into the habit of writing down their thoughts. To overcome this difficulty, IMS provides students with support such as encouragement, advice, supply of hints and tips for continuation.

Since 2009, the first author has been developing and operating a Web-based LMS personally for the purpose of education and research, especially for learning programming and web development [2], [3]. Basically, LMS is a tool that allows students to login on a daily basis, submit assignments and reports as learning outcomes, and check the status and their tentative score. Therefore, it has a high affinity with the activities of the IMS where students are expected to create and record ideas every day. In this research, we introduced fundamental functions of the IMS into the LMS. We adopted the LMS (IMS-LMS) to a first-year education of institute of technology.

II. IMS-LMS: LMS INTEGRATED WITH IMS

In this section, we describe detail of the LMS integrated with IMS. Generally, functions for supporting IMS activity can be categorized as (s) for students and (t) for teachers. Former functions (for students) consist of (s1) record cumulative number of ideas and (s2) check the cumulative number record as table/graph. The latter functions (for teachers) consist of

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Fig. 1. (s1) Register a cumulative number of ideas (Note: This page was translated by Google translate)

(t1) check the cumulative numbers reported by students and (t2) send encourage messages (e-mail) to selected students.

Basically, teachers do not browse student idea notes nor refer student ideas. It aims to trust students, and foster student independence and autonomy. Thus, the students only report cumulative number of ideas, not the idea itself. Figure 1 shows the web interface of registering a cumulative number of ideas. To make it easier to register with iPad tablet device (lent by the first author's institute), we prepared "increase" and "decrease" buttons in addition to the usual number field. Also, we provided an additional text field for personal memo, which is optional but it may help students to keep their thoughts with the cumulative number of ideas.

When the student registers the cumulative number, a daily progress graph is shown with growing animation (Figure 2). The student can confirm the graph and check the progress. Moreover, the student can see the detail list of date/cumulative number/personal memo in table format at any time.

The teachers can check the registered cumulative number by tabular (Figure 3) and graph (Figure 4) formats. The tabular
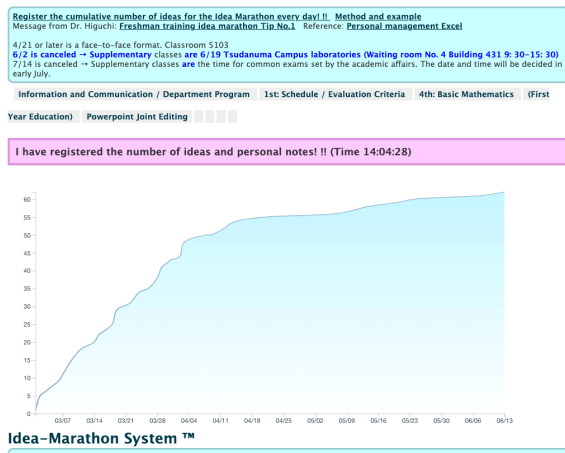
Fig. 2. (s2) Daily progress graph (Note: This page was translated by Google translate)

format allows to see who updated when and how increased by the cell colors. Also, the teachers can sort rows by clicking a column header. By sorting rows, the teachers can browse the number of ideas at the time of the past. The teachers can download the table as spreadsheet file format for further analysis. The graph format represents each student progress as a line. Thus, it provides overall progress, and the teachers can grasp the whole situation and tendency. Two straight line slopes represent reference paces. Blue and red lines show three and one ideas per day, respectively. Note that the graph view (Figure 4) was generated by D3.js. The teachers could check latest tendency quickly via a conventional web browser.

For (t2) function, we prepared an interface for selecting message receivers (Figure 5). The table shows number of access (all term/2week/1week/1day/1hour), group, tentative score, status of assignment and cumulative number of ideas. The teacher firstly sorts the students by one of the columns. Then the teacher selects message receivers by checking. The pop-up menu provides a function to check/uncheck multiple check boxes at once.

III. Related works

Idea-Marathon System has been applied for many universities/institutes including freshmen [4]. This work can also be categorized and positioned as part of the series of creativity enhancement learning program for freshmen. Most of the former practices employs teaching assistants (TAs) to aggregate the number of participant's ideas. However, we could not ask TAs to support in this lecture. Therefore, we needed to create a mechanism for students to independently report the number of ideas while referring to the preceding practical examples.

Similar approach which develops model of Creative Economy Thinking with IMS via cloud computing technology are reported as [5]. Our research focused on functions of IMS incorporated with LMS, and evaluated the functions through actual learning course.

IV. Practice

In this section, we describe practical examples that we have conducted using the developed IMS-LMS. We applied IMS-LMS to "Freshmen Seminar," the first-year lecture course for new university students. The lecture course "Freshmen Seminar" consists of two parts: (1) two-day workshop and (2) weekly lecture.

A. Two-day workshop

The educational institution to which the first author belongs offers a two-day, six-hour training course for new students. The following elements of educational objective should be included in the workshop.

- Deepen the understanding of the significance of learning in the department and common understanding as a team.
- Raise team awareness between students and faculty members within the department and try to form rapport as much as possible.
- Deepen self-understanding, promote understanding of others, and learn the need for independent communication.
- Learn the need to work with others and the elements needed for smooth team work.

To achieve the above educational objective, we conducted IMS for the workshop. Reasons other than the above for conducting IMS include encouraging students who are starting university life to be active and motivated to learn.

The two-day workshop (three hours per day) was held a few days before the entrance ceremony and the first orientation. Thus, the students could not utilize official LMS nor email account at that moment. Therefore, we provided temporal account of IMS-LMS for the student.

At the beginning of the workshop, we distributed personal notebooks to all students. Figure 6 shows the scene of invited talk on the first day. In the invited talk, the second author introduced the background of devising the IMS, the effect of continuous practice, the results of training conducted at universities, elementary and secondary education institutions, and companies in Japan and overseas, and motivated students. Students were asked to think about three ideas, including the declaration of the start of the idea marathon, and write them in your personal notebook.

Figure 7 shows the scene of group work on the second day. In the group work, the students discussed and selected their ideas, and added drawing to express the idea. The drawing was presented by the students at the end of workshop (Figure 8).

At the end of the two-day workshop, the students logged-in to the IMS-LMS. We asked the students to (1) input comment the two-day workshop, and (2) input cumulative number of ideas.

B. Weekly Lecture

The main purpose of "Freshmen Seminar" was to systematically understand the research fields and characteristics of information and communication engineering, their position in society, etc., and to show students the direction in which they should learn in the future.

The students firstly learned the manners of using e-mail, how to write reports, and the basics of presentations. Then

Fig. 3. (t1) Tabular format of cumulative numbers. Cell color represents updated and increase of cumulative number of ideas.
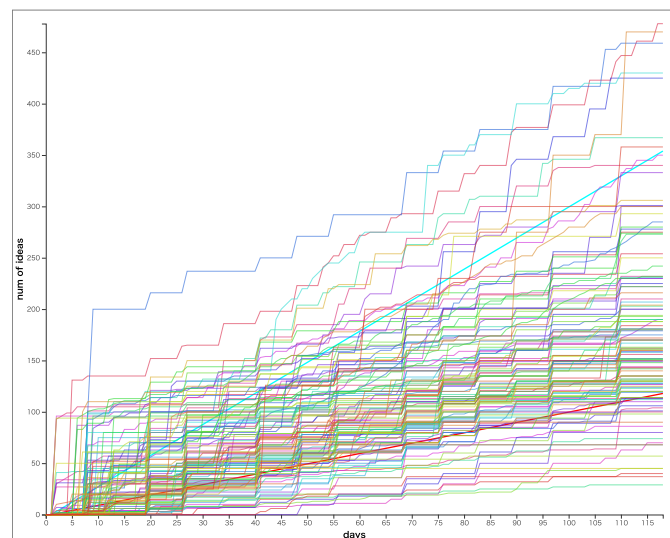

Fig. 4. (t1) Graph format of cumulative numbers. Two straight line slopes represent reference paces. Blue line shows three ideas per day. Red line shows one idea per day.

Fig. 5. (t2) Selecting message receivers.

they received explanations about the education and research of the faculty members of the department. After that, the students visited each laboratory, and prepare a presentation explaining the research contents in their own words. Finally, presentations by student group were held, and mutual evaluation was conducted among the students.

Most of the lecture content was not directly related to the idea technique, creativity, and idea generation, but I encouraged the students to write down their findings and their thoughts in the distributed notebooks. The teacher assigned tasks weekly, and all assignment reports were collected by IMS-LMS. Thus, the students were always aware of logging in to the IMS-LMS. To further raise awareness of the IMS, the teacher had the students fill out a number of ideas on a physical sheet and collect them in all face-to-face lectures. The numbers were manually registered to IMS-LMS after the face-to-face lecture. In addition to this, in order to motivate
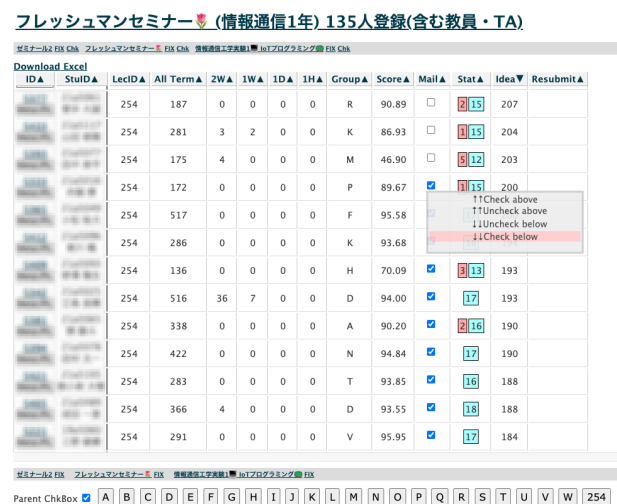
students to come up with ideas, the number of ideas and the number of voluntary reports are reflected to IMS activity score monthly from April to July. The maximum IMS activity score was decided to 1.5 points per month.

C. Result

We analyzed correlations of following values to capture student behavioral tendencies on IMS-LMS.

- Number of accesses to IMS-LMS. It contains all activities regarding assignment tasks and IMS during a course term.
- Number of cumulative ideas.
- Score of the weekly lecture.

Table I shows stats of these values. The largest correlation was between access and score ($r=0.312$, $t=3.74$, $p<.001$). The correlation between idea and score was 0.300 ($t=3.59$, $p<.001$). The smallest correlation was between access and score ($r=0.28$, $t=3.27$, $p=.001$). These results shows that there were weak positive correlations among access, score, and ideas.

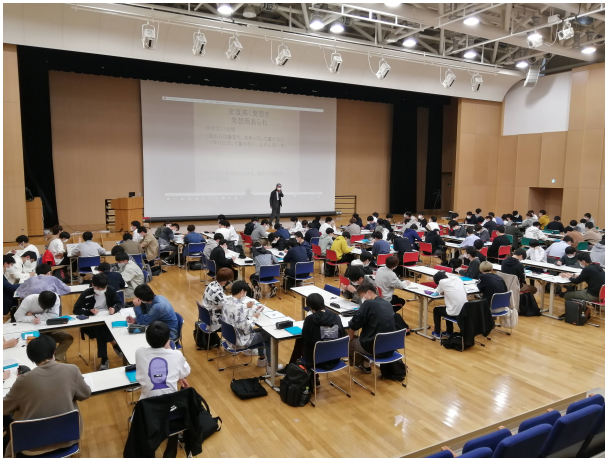Fig. 6. Workshop Day1 (Invited Talk)

Fig. 7. Workshop Day2 (Group work)

Fig. 8. Workshop Day2 (Presentation)

We also conducted a questionnaire survey for the students. The questionnaire survey consisted of twelve 5-step Likert scale questions and one open comment. The result of Q1 (frequency of thinking, Figure 9) showed that more than 75% of students had increased the frequency of thinking. Also, almost 50% of students had a sense of fulfillment (Figure 13)

TABLE I
STATS OF IMS-LMS ACCESS, IDEA, AND SCORE ($n = 130$)

	Access	Idea	Score
max	1822	478	97.4
min	27	29	5.5
average	306	180	87.9
median	271	160	92.6
S.D.	228.9	89.5	16.4

, and answered to continue IMS after the lecture (Figure 17).

We obtained 64 comments from the students. Some positive opinions for IMS and the lecture are shown below.

- At first, I was worried whether I could continue, but I was able to enjoy the activity with the hints of Professor Higuchi. Somehow, I feel that the three months of activity have strengthened my thinking ability and the creativity that I feel I am not good at. The ideas and hints presented by Professor Higuchi were very fresh and interesting. In the future, I would like to continue steadily within a reasonable range without thinking difficult for myself in the future. Thank you very much.
- I felt that my ideas tended to be biased, probably because I hadn't had time to write what I thought I was writing. Especially since I spend a lot of time commuting to school by train, I had many ideas related to trains. I thought I needed to share my ideas when I had time.
- I didn't think that I wouldn't just write down what I thought or thought about in my daily life, but just write it down. I used to think about it before I started the idea marathon, but I didn't even write it, so I would like to continue the idea marathon.
- It was a very good experience because I had never continued for three months in my life. I wanted to continue as much as possible.
- As I continue the idea marathon, I don't know at the moment whether I have acquired the ability to think, but I felt that I had more opportunities and time to think.

V. CONCLUSION

To enhance continuous awareness for creative mind, we have developed IMS-LMS, which is an LMS that incorporates IMS. By applying IMS-LMS to a lecture course for university freshmen, we could confirm that there are weak positive correlations among the number of LMS access, the cumulative number of ideas, and student score. Even though the lecture course content was not highly related to idea generation and creative thinking, fifty percent of students succeeded in developing the habit of continuing the IMS. We consider that the first two-day workshop and dedicated messages to students were important factors in changing students' consciousness and developing a habit of continuing creative activities.

ACKNOWLEDGMENT

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Motoki Miura is a professor at the Faculty of Engineering, Chiba Insitute of Technology. He received B.S., M. E., and D. E. degrees in electronics engineering from the University of Tsukuba in 1997, 1999, and 2001, respectively. From August 2001 to March 2004, he worked as a research associate at TARA Center, University of Tsukuba. From April 2004 to March 2009, he worked as an assistant professor in the School of Knowledge Science, Japan Advanced Institute of Science and Technology. From April 2009 to March 2020, he worked as an associate professor at the Department of Basic Sciences, Faculty of Engineering, Kyushu Institute of Technology. His research interests includes Human-computer interaction (HCI), Creativity support systems, Computer science education, and Information systems in education.

Takeo Higuchi is an education and ability development consultant for universities and companies in Tokyo, Japan, the founder of the Idea-Marathon System, and ex-chairman of the counsellor of Japan Creativity Society, Tokyo, Japan. He worked as a senior manager of Mitsui & Co., Ltd, Japan, stationed in Nigeria, Saudi Arabia, Vietnam and Nepal for 19 years. He received Ph.D. from Japan Advanced Institute of Science and Technology in 2014.

APPENDIX

A. Questionnaire results

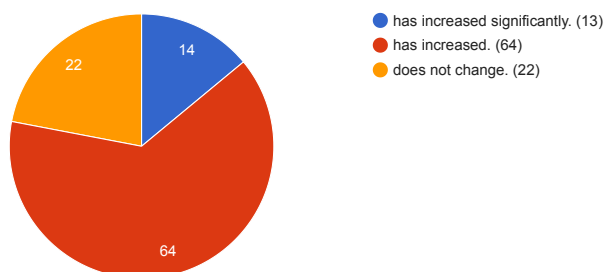**1. After starting the Idea Marathon, the frequency of thinking**

- has increased significantly. (13)
- has increased. (64)
- does not change. (22)

Fig. 9.　Frequency of thinking

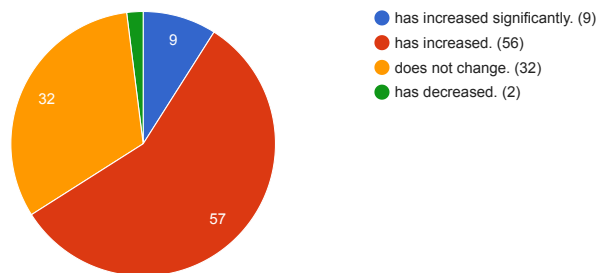**2. During the three months of the Idea Marathon, the frequency of thinking and writing**

- has increased significantly. (9)
- has increased. (56)
- does not change. (32)
- has decreased. (2)

Fig. 10.　Frequency of thinking and writing

3. During the three months of the Idea Marathon, "think-and-write"

- has become a habit. (12)
- has become a fairly habitual practice. (54)
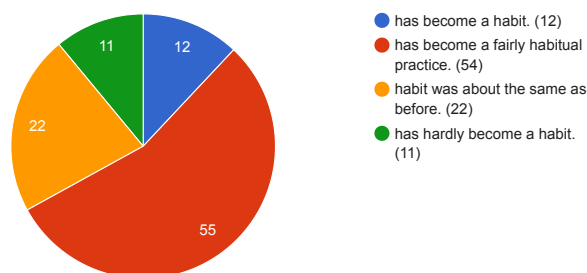- habit was about the same as before. (22)
- has hardly become a habit. (11)

Fig. 11.　"Think-and-write" habit

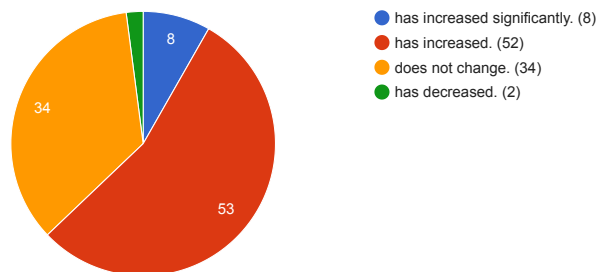**4. During the three months of the Idea Marathon, the frequency of thinking "I have to memorize it"**

- has increased significantly. (8)
- has increased. (52)
- does not change. (34)
- has decreased. (2)

Fig. 12.　Consciousness of writing

5. During the three months of the Idea Marathon,

- I have a great sense of fulfillment. (7)
- I have a sense of fulfillment. (43)
- I sometimes feel fulfilled. (46)
- I have a few sense of fulfillment. (3)
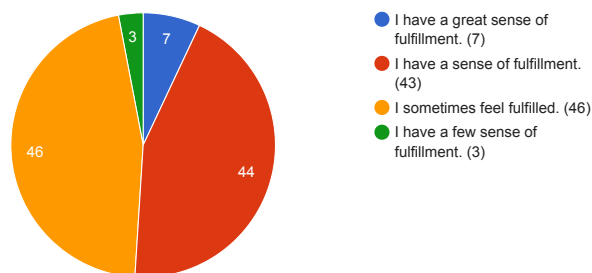
Fig. 13.　Fulfillment

6. Do you think the Idea Marathon will be useful in the future?

- I think very useful. (21)
- I think fairly useful. (47)
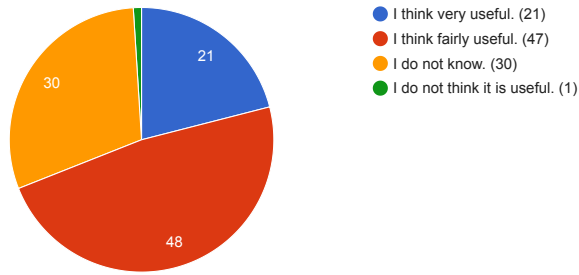- I do not know. (30)
- I do not think it is useful. (1)

Fig. 14. Will it be useful in the future?

7. Do you think the Idea Marathon will be useful for college students?

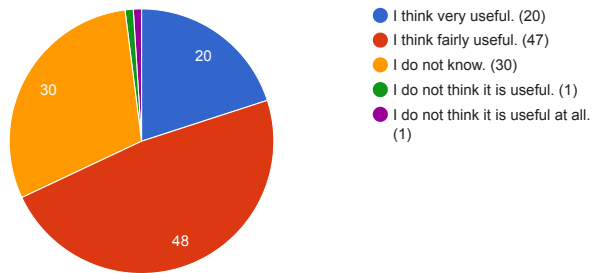- I think very useful. (20)
- I think fairly useful. (47)
- I do not know. (30)
- I do not think it is useful. (1)
- I do not think it is useful at all. (1)

Fig. 15. Is it useful for college students?

8. Is it important for you to keep a note in your notebook?

- I think very important. (15)
- I think fairly important. (46)
- I do not know. (31)
- I do not think it is important. (5)
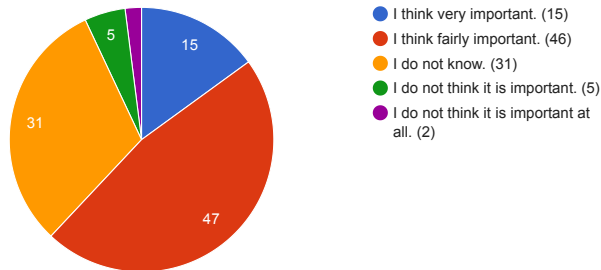- I do not think it is important at all. (2)

Fig. 16. Do you think it's important to record in a notebook?

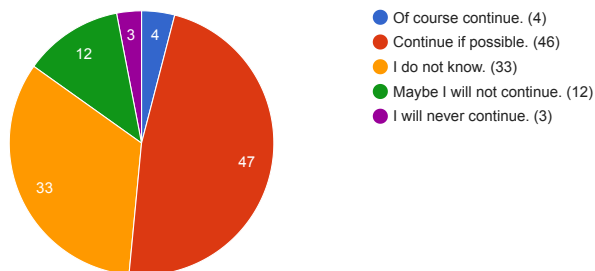**9. No one will confirm, but will you continue the idea marathon after the lecture?**

- Of course continue. (4)
- Continue if possible. (46)
- I do not know. (33)
- Maybe I will not continue. (12)
- I will never continue. (3)

Fig. 17. Will you continue the idea marathon?

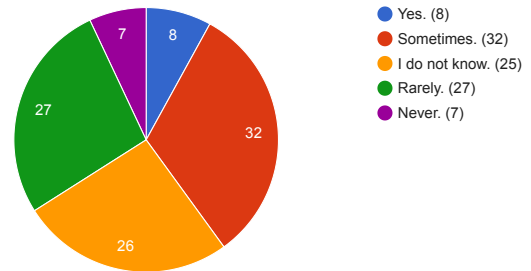**10. Did you share and inspire each other about the number of ideas within the group?**

- Yes. (8)
- Sometimes. (32)
- I do not know. (25)
- Rarely. (27)
- Never. (7)

Fig. 18. Did you share and inspire each other?

11. Did Dr. Higuchi's weekly ideas and hints help you to come up with ideas?

- I think very useful. (19)
- I think fairly useful. (54)
- I do not know. (20)
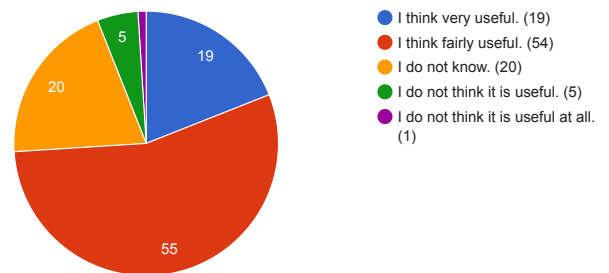- I do not think it is useful. (5)
- I do not think it is useful at all. (1)

Fig. 19. Did weekly hints help you to come up with ideas?

12. Do you think Dr. Higuchi's followed up is effective for the idea marathon?

- I think very effective. (14)
- I think fairly effective. (51)
- I do not know. (28)
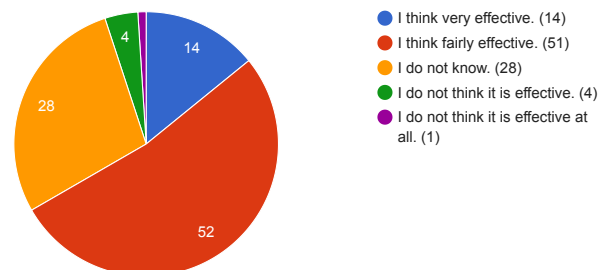- I do not think it is effective. (4)
- I do not think it is effective at all. (1)

Fig. 20. Do you think the follow-up is effective?