A Method for Consensus Building between Teachers and Learners in a Value Co-Creative Learning Service

Ryota Sugino, Satoshi Mizoguchi, Koji Kimita, Keiichi Muramatsu, Tatsunori Matsui, Yoshiki Shimomura

Abstract—Improving added value and productivity of services entails improving both value-in-exchange and value-in-use. Value-in-use is realized by value co-creation, where providers and receivers create value together. In higher education services, value-in-use comes from learners achieving learning outcomes (e.g., knowledge and skills) that are consistent with their learning goals. To enhance the learning outcomes of a learner, it is necessary to enhance and utilize the abilities of the teacher along with the abilities of the learner. To do this, however, the learner and the teacher need to build a consensus about their respective roles. Teachers need to provide effective learning content; learners need to choose the appropriate learning strategies by using the learning content through consensus building. This makes consensus building an important factor in value co-creation. However, methods to build a consensus about their respective roles may not be clearly established, making such consensus difficult. In this paper, we propose some strategies for consensus building between a teacher and a learner in value co-creation. We focus on a teacher and learner co-design and propose an analysis method to clarify a collaborative design process to realize value co-creation. We then analyze some counseling data obtained from a university class. This counseling aimed to build a consensus for value-in-use, learning outcomes, and learning strategies between the teacher and the learner.

Keywords—Consensus building, value co-creation, higher education, learning service.

I. INTRODUCTION

IMPROVING added value and the effectiveness of services entails improving both value-in-exchange and value-in-use. Value-in-exchange is realized by exchanging products/services for consideration; value-in-use is realized by using products/services. As a result, value-in-use is defined by a product/service receiver, and therefore a provider needs to provide a product/service that satisfies the receiver's requirements. In order to realize high value-in-use, a provider and a receiver need to build a long-term relationship and co-create value that can achieve these requirements. To realize value co-creation, it is important for a provider to involve a receiver in the development process of products and services [1]. Therefore, a receiver needs to play the role of both a user and a value co-creator in order to realize value co-creation [2]. To be a value co-creator, a receiver needs to acquire, enhance, and

Ryota Sugino, Satoshi Mizoguchi, Koji Kimita and Yoshiki Shimomura are with Tokyo Metropolitan University, Asahigaoka 6-6, Hino-shi, Tokyo, Japan (e-mail: sugino-ryota@ed.tmu.ac.jp, mizoguchi-satoshi@ed.tmu.ac.jp, kimita@tmu.ac.jp, yoshiki-shimomura@center.tmu.ac.jp).
Keiichi Muramatsu is with Saitama University, Shimo-Okubo 255, Sakura-ku, Saitama-shi, Saitama, Japan, (e-mail: muramatsu@mech.saitama-u.ac.jp).
Tatsunori Matsui is with Waseda University, Mikajima 2-579-15, Tokorozawa-shi, Saitama, Japan (e-mail: matsui-t@waseda.jp).

utilize the abilities of the value co-creator. At the same time, a provider must also acquire, enhance, and utilize abilities for realizing high value-in-use. Fig. 1 shows the relationship of value for providers and receivers in services. In an ideal environment, methods of acquiring and enhancing the abilities are established; however, realizing value co-creation in this way is difficult. The purpose of this study is to clarify the mechanisms for value co-creation for realizing effective value co-creation. To do so, we propose a method of consensus building between a provider and a receiver and develop an analysis method of a co-design process to clarify the method. This allows the receiver to play the role of value co-creator in the product/service life cycle.
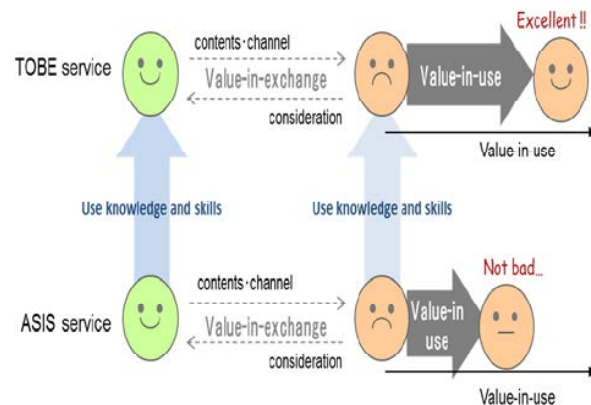

Fig. 1 Relationship among values, a provider and a receiver in service

II. VALUE CO-CREATION IN LEARNING SERVICE

A. Problems in Higher Education

While value co-creation is important for realizing value-in-use for learners in higher education services, higher education still has problems with value-co-creation. In higher education services, it is important for learners to achieve their learning outcomes, in order to realize high value-in-use. To enhance learning outcomes of a learner, it is crucial to improve the quality of the learner's independence [3]. To do this, however, it is necessary for the learner and the teacher to build a consensus about learning outcomes that the learner aims for and learning strategies to achieve the learning outcomes. Moreover, a teacher needs to provide effective learning content, whereas the learner needs to choose the learning strategies, including the learning content, appropriately through consensus building. However, a teacher conducts a class without reflecting a learner's goals and requirements to learning content and tools, as shown in Fig. 2. Therefore, only a teacher who can provide

learning content and appropriate tools to a learner and a learner who can utilize them are able to enhance learning outcomes.
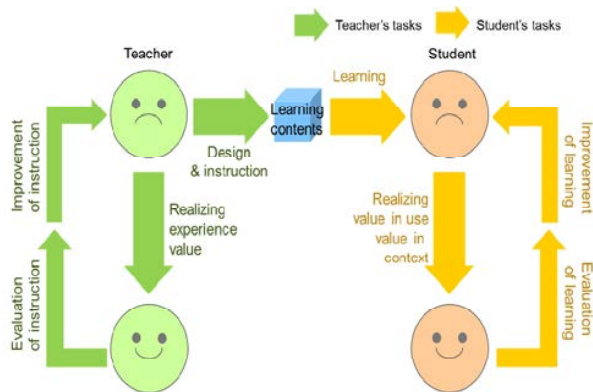

Fig. 2 Learning service in higher education

B. The Ability of Value Co-Creation

We define the ability of value co-creation as competency and literacy. Competency is defined as a potential characteristic of individuals for realizing an effective and superior value in some contexts [4]. It is considered as part of an operant resource that is the fundamental source of competitor advantage [5] and contains not only a superficial ability (e.g., a skill and ability) but also a potential ability and attribution (e.g., motivation and personality). Literacy is defined as an ability to apply and integrate resources efficiently for suggesting and realizing value in some contexts. Fig. 3 shows the relation between competency and literacy [6].
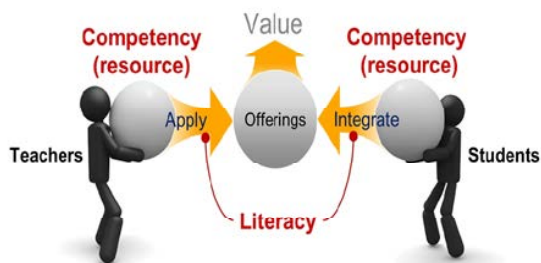

Fig. 3 Relation between competency and literacy [6]

C. Ideal Learning Service

In order to realize value co-creation in higher education, a learner needs to play a role of value co-creator and co-create value with a teacher. Therefore, a learner needs to acquire and enhance the ability of the value co-creator. Fig. 4 shows the ideal learning service that involves the learner in the teacher's process. In order to realize the ideal learning service, the teacher and the learner need to build a consensus about their respective role. In this paper, we suggest a method for analyzing processes of consensus building between a teacher and a learner in co-designing to realize ideal learning services.
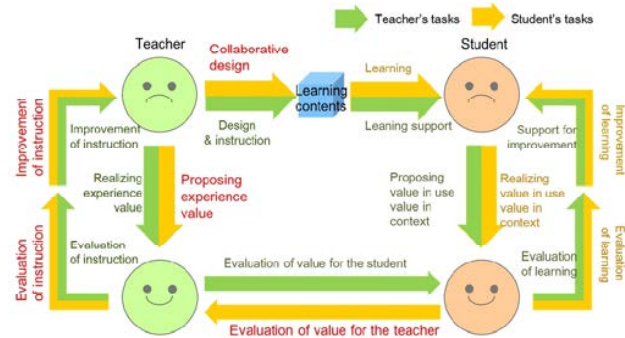

Fig. 4 Ideal learning service

III. PROPOSED METHOD

For clarifying the process of consensus building so that a learner acquires and enhances the ability of the value co-creator, we propose two methods for analyzing the process of consensus building. The first method is a design solution model for analyzing results of design solutions and basis. The second method is for analyzing the process of co-designing.

A. Design Solution Model

Fig. 5 shows a design solution model for analyzing the results of design solutions and basis for expanding the model that are derived by co-designing. This model organizes design solutions by viewpoints of "Why," "What," "How," and "Entity" (Table I). The "Why" viewpoint describes a learner's desirable states and requirements. "What" describes learning objectives to attain for realizing an item in the viewpoint of "Why." "How" describes teaching and learning strategies for realizing an item in the viewpoint of "What," and "Entity" describes learning tools for an item in the viewpoint of "How." Fig. 5 (right panel) shows a design basis list, which organizes what a teacher and a learner build by consensus as basis. Thereby, the proposed model enables to visualize design solutions and basis, and to analyze the results of the consensus building in the co-design process. Moreover, by visualizing knowledge (e.g. know-how of designing teaching/learning strategies and expanding the model), it becomes possible for a teacher to modify his/her design solutions and to improve the way a class is designed. On the other hand, a learner is able to learn how to design learning methods and design his/her learning through co-designing with a teacher.

B. Method for Analyzing the Co-Design Process

Fig. 6 shows a method for analyzing the co-design process. This method is based on the learning state map, which Kimita [7] proposed for analyzing the level of a learner's achievement and the process to reach the level in higher education services. Our proposed method describes a state in the process of co-designing and an item of consensus building by using the design solution model and the design basis list. In addition, a stratagem matrix organizes the state transition from a certain state (ASIS state) to the next state (TOBE state). By using these models, we can visualize the state transition process on the map.
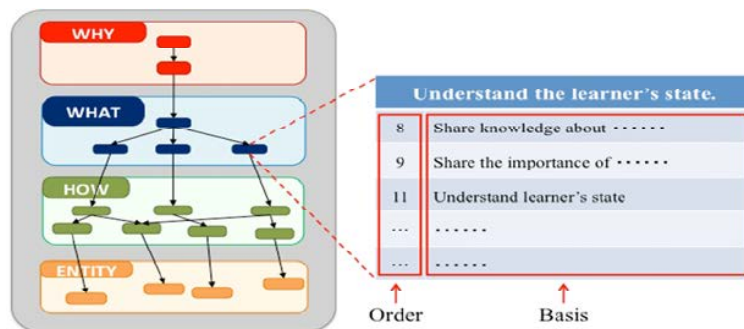
Fig. 5 Design solution model

TABLE I
VIEWPOINTS OF CONSENSUS BUILDING

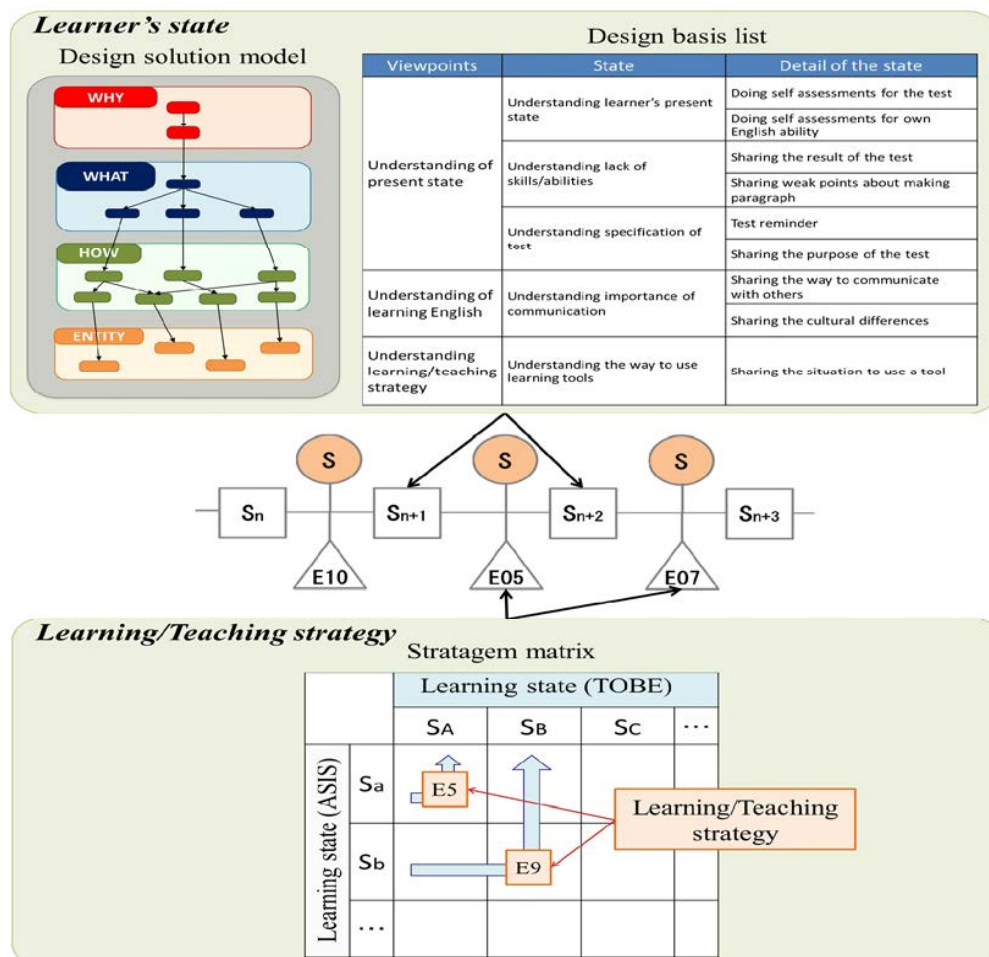| Design solution	Viewpoints
Learner's TOBE state and requirements	WHY
Learning objective	WHAT
Teaching and learning strategies	HOW
Learning tools	ENTITY

Fig. 6 Method for analyzing the co-design process

IV. APPLICATION

In this paper, as a first step of application, we conducted the application of the design solution model to confirm effectiveness of the model. To clarify a co-design process between a teacher and a learner, we analyzed the results of counseling in an English class that is part of the Creative Engineering Project at The University of Tokyo. In this validation, a teacher provided about two one-hour counseling sessions for each learner to co-design learning. We then evaluated the learner's outcomes through an examination that evaluates the learner's communication ability in English. Moreover, learners filled out a questionnaire before and after co-designing to evaluate changes in their learning motivation. The questionnaire was prepared based on the ARCS model [8]. The ARCS model is used for promoting and sustaining motivation in learning process from the viewpoints of attention (A), relevance (R), confidence (C) and Satisfaction (S) [8]. In this validation, we analyzed nine out of 19 learners who had an improved score for learning motivation. We present two instances as the results of the analysis. Fig. 7 shows the results when a learner improved both the examination score and the learning motivation (as learner A). Fig. 8 shows the results when a learner improved only learning motivation (as learner B). From these results, the authors confirmed that both learners A and B had the same requirements about studying abroad as a learner's TOBE state. However, they had different design solutions for "What." Learner A's learning purpose for improving communicating ability was focused on English conversation, while learner B's learning purpose was getting an advanced level examination score. We confirmed that learning purposes differed for each learner even if they had the same learner's TOBE state.
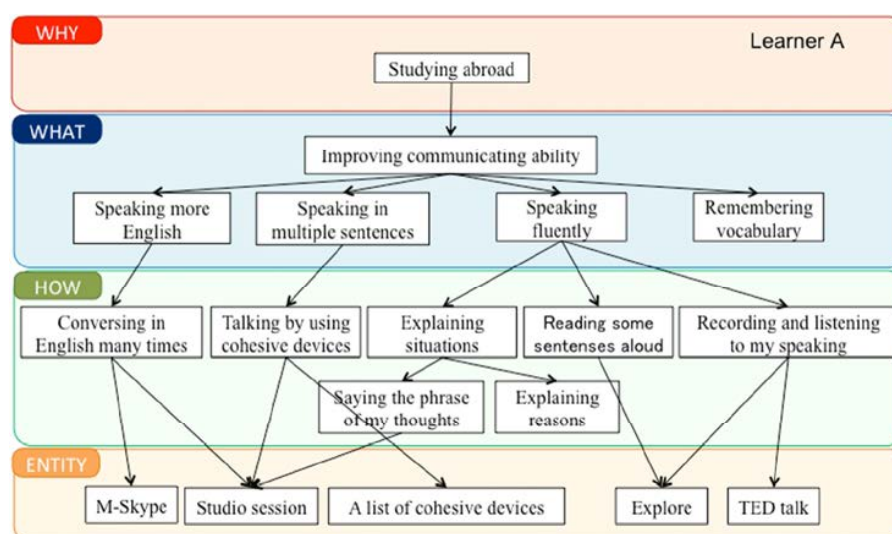
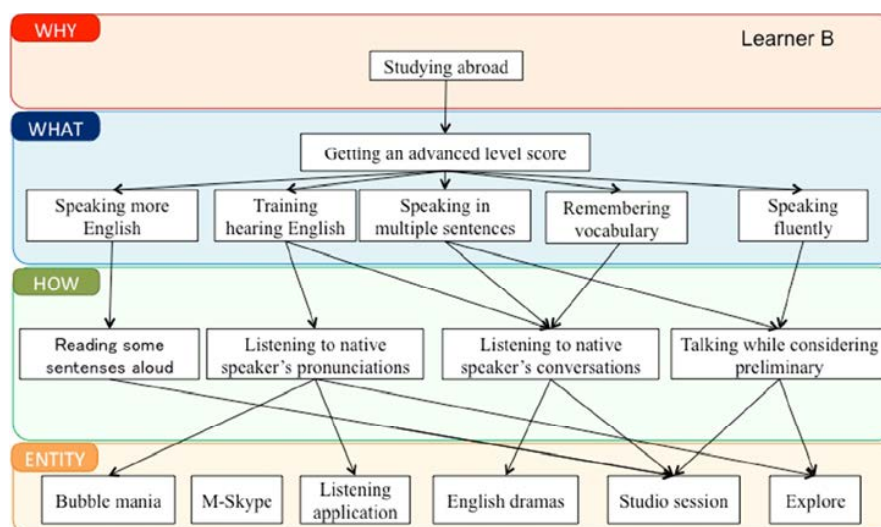Fig. 7 Design solution model of learner A

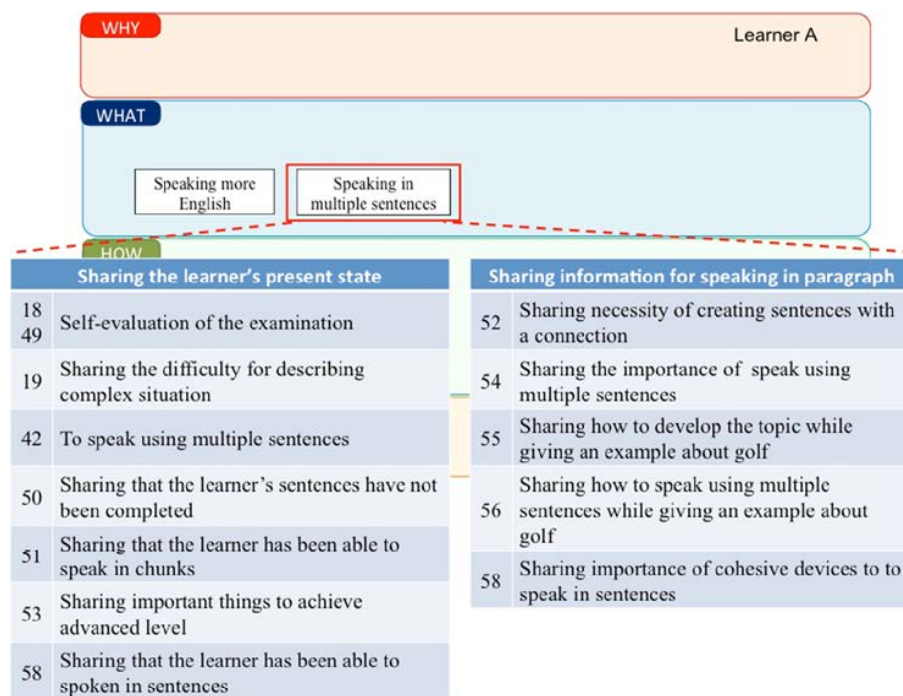Fig. 8 Design solution model of learner B
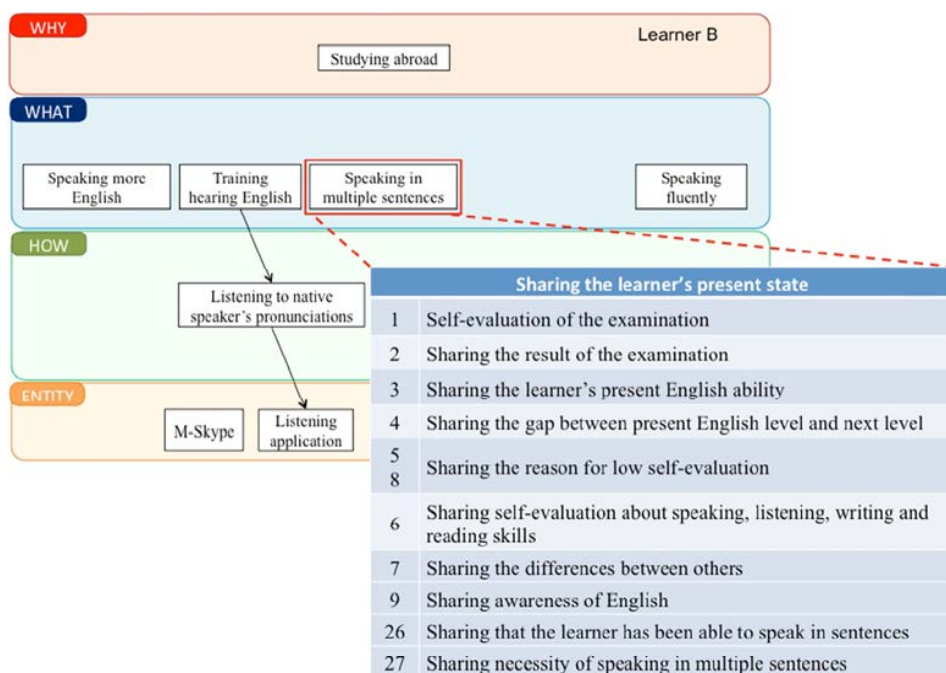
Fig. 9 Design solution and basis of learner A

Fig. 10 Design solution and basis of learner B

They had the same purpose, for instance, they had a design solution about speaking more English. However, the design solution connected different learning strategies in the for "How." Learner A, for example, had the design solution to maximize the amount of time conversing in English, whereas learner B had the design solution to read sentences aloud. In addition, we confirmed learner A built consensus more concretely with the teacher than did learner B. By analyzing the counseling data, the authors clarified the design solution and design basis of learning that is co-designed by a teacher and a learner. Figs. 9 and 10 show certain phases of analysis. We confirmed learner A initially built a consensus on the learning purpose for "What" and the learning strategy for "How" and then built a consensus on his/her TOBE state for "Why." On the other hand, Learner B

initially built a consensus on his/ her TOBE state for "Why" and then built a consensus on the learning purpose for "What" and the learning strategy for "How." Moreover, we confirmed that consensus building for the same learning purpose or strategy had different design bases. For instance, learner B built consensus on his/her ability as design basis for the design solution of speaking in multiple sentences. On the other hand, learner A built consensus on his/her ability along with concrete instances as the design basis for the design solution of speaking in paragraph. From these results, our proposed method enabled visualizing the design solutions and basis in the co-design process. Accordingly, we consider this proposed method as feasible for analyzing value co-creation in the co-design phase.

V. DISCUSSION

From the results of the verification, we confirmed that our proposed method makes it possible to analyze the co-design process and design solutions. We confirmed the differences between learners who improve their examination score and those who improved their learning motivation. The former expand design solutions with a concrete design basis when they build a consensus about learning objectives ("What") and teaching/learning strategies ("How"). In addition, we confirmed that there are various processes to improve the learning motivation score. Learner A expanded the design solution from the viewpoint of "What," but learner B expanded it from the viewpoint of "Why." Nevertheless, both learners improved their learning motivation. From these results, our proposed method makes it possible to co-design for realizing effective value co-creation by analyzing the relation between design solution and process and realized value. However, in this study, teachers co-designed learning with individual learners. Therefore, the design solutions and co-design process are different for each learner, and time and labor are needed to organize co-design strategies using these results for realizing effective value co-creation.

Accordingly, a method for organizing strategies to expand and formulate concrete design solutions while considering the state of the teacher and learner is required to integrate multiple results. We suggest the use of the interpretive structural modeling (ISM) method [9] for organizing strategies of co-design. The ISM method is used to comprehensively visualize complicated structures that contain multiple elements as a hierarchical directed graph. The ISM method is a well-established method for identifying relationships among particular items and helps organize the relationships among items of a system. For organizing co-design strategies, design solution models that describe relationships among elements need to be organized. Therefore, we consider that the ISM method can be used to organize strategies that are found by our design solution model.

VI. CONCLUSION

This paper focuses on a collaborative design between teachers and learners. We proposed a design solution model for analyzing design solutions and as a basis to clarify the

co-design process for realizing value co-creation. By using our proposed method, we analyzed the co-design process in an English class. From the results of the analysis, we confirmed the effectiveness of our method. For future research we propose integrating the ISM method into our proposed method for supporting co-design.

REFERENCES

[1] McKenna, R, Real-Time Marketing, Harvard Business Review, 73(4), pp.87-89, 1995.
[2] Vargo, S. L. and Lush, R. F., Evolving to a new dominant logic for marketing, Journal of Marketing, Vol.68, No.1, 2004.
[3] Sugihara, M., The process of university students' becoming autonomous and cooperative concerning their learning in general education: from the viewpoint of role reconstruction in the learning community, 2011.
[4] Spencer, L. and Spencer, S., Competence at Work, John Wiley & Sons, Inc., 1993.
[5] Vargo, S. L. and Lusch, R. F., Service-dominant Logic: Continuing the Evolution, Journal of the Academy of Marketing Science 36: 1–10, 2008.
[6] Sugino, R., Mizoghchi, S., Kimita, K., Ishi, T. and Shimomura, Y., Discussion on Competence and Literacy Concepts in Education Service, the Japan Society of Precision Engineering, pp. 663-664, 2015. in Japanese
[7] Kimita, K., Muto, K., Mizoguchi, S., Nemoto, Y., Ishii, T. and Shimomura, Y., Learning state model for value co-creative education services, human interface and the management of information, Part II, Lecture Notes in Computer Science, Vol.9173, pp.341–349, 2015.
[8] J. M. Keller, Development and use of the ARCS model of instructional design, Journal of instructional development, Volume 10, Issue 3, pp. 2-10, 1987.
[9] A. Sage. Interpretive Structural Modeling: Methodology for Large-scale Systems, 91–164. McGraw-Hill, New York, 1977.