

A Method for Consensus Building Between Teachers and Learners in Higher Education Through Co-design Process

Ryota Sugino¹(✉), Satoshi Mizoguchi¹, Koji Kimita¹, Keiichi Muramatsu², Tatsunori Matsui³, and Yoshiki Shimomura¹

¹ Department of System Design, Tokyo Metropolitan University, Tokyo, Japan
{sugino-ryota, kimita}@tmu.ac.jp, mizoguchi-satoshi@ed.tmu.ac.jp,
yoshiki-shimomura@center.tmu.ac.jp

² Department of Science and Engineering, Saitama University, Saitama, Japan
muramatsu@mech.saitama-u.ac.jp

³ Department of Human Sciences, Waseda University, Saitama, Japan
matsui-t@waseda.jp

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

1 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 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. Figure 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. 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.

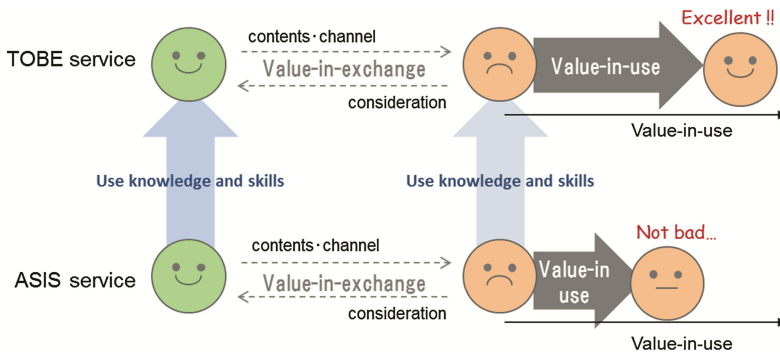


Fig. 1. Relationship among values, a provider and a receiver in service

2 Value Co-creation in Learning Service

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

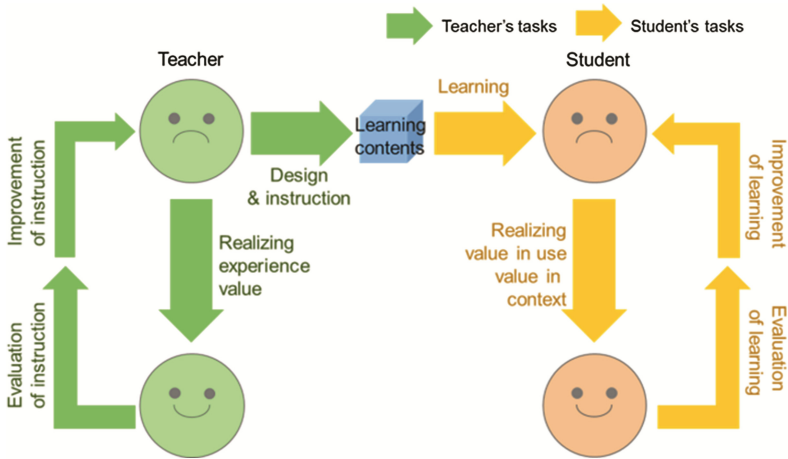


Fig. 2. Learning service in higher education (Color figure online)

2.2 Ideal Learning Service

From the services viewpoint, learners in higher education institutions can be regarded as customers, and the value of an education is therefore determined by learners. In addition, learners work as value co-creators; in other words, while teachers must provide effective contents, learners must perform adequate learning behaviors. In order to realize such an educational service, Kimita [4] proposed the education process shown in Fig. 3. First, a teacher develops an assumption about learning outcomes for learners. Learning outcomes are realized as state change that is desirable for the learner. In this step, then, the teacher identifies what constitutes the valuable state for learners, designs educational contents and suggests them to the learners. Here, the teacher needs to build a consensus with learners about the educational contents and the learning outcome. After building this consensus, the teacher provides the educational contents and conducts a formative evaluation in order to improve them. Finally, an overall evaluation is conducted.

In order to realize value co-creation in higher education outlined above, a learner needs to play a role of value co-creator and co-create value with a teacher. Therefore, a learner needs to acquire, enhance, and use the ability of the value co-creator. Figure 4 shows the ideal learning service that involves the learner in the teacher’s process. In order to realize it, 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-design process to realize ideal learning services.

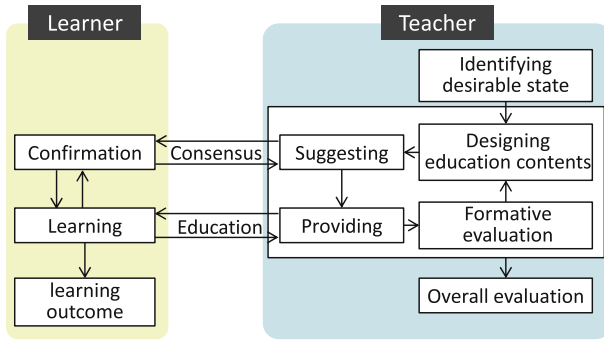


Fig. 3. Overview of the proposed education process [4]

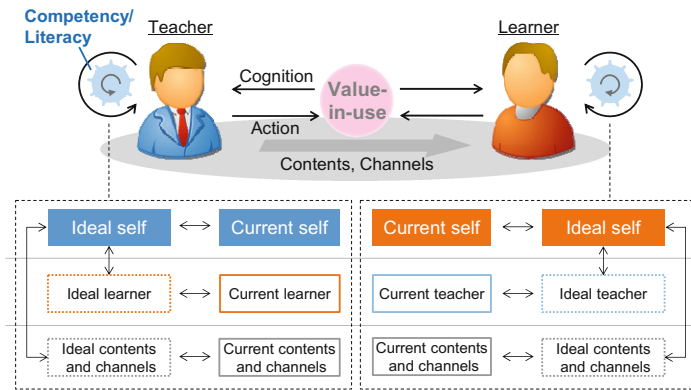


Fig. 4. A model for service value co-creation [5]

As a perspective on consensus building, this study adopts a model of service value co-creation [5]. The rest of this section introduces the detail of this model in higher education.

A Model for Value Co-creation in Higher Education Service. Figure 4 shows the proposed service model, which includes the co-growth of teacher and learner, along with its driver. A teacher proposes a value to a learner through contents and learning tools. The learner perceives the proposed value in a specific context. In response to the perceived value, the teacher modifies his/her actions, and the learner also modifies their actions to improve the service. In this model, value is co-created by such modifications of providing and receiving action in use of the service. Here, reflectiveness is regarded as the ability to appropriately modify one’s own actions. The original meaning of “reflect” is to modify one’s own actions by comparing one’s own ideal model with the current state. However, the value of a service is co-created by mutual interactions between teacher and learner. Each should reflect on the other, and on contents and channels as well as on themselves. As shown in the lower section of Fig. 4, reflectiveness is defined here as an ability to appropriately modify one’s own actions in comparing the

ideal teacher, learner, contents, and channels. To realize a value co-creative service, it is extremely important for both teacher and learner to have this ability. Idealizing each other is a required condition of the service; if there is a large gap between their ideal state and the current state, it will be difficult to form a co-creative relationship between teacher and learner. For that reason, negotiation and consensus building about these gaps is necessary for realizing a viable co-creative relationship.

3 Proposed Method

3.1 Design Solution Model

Figure 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.” 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.” Figure 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.

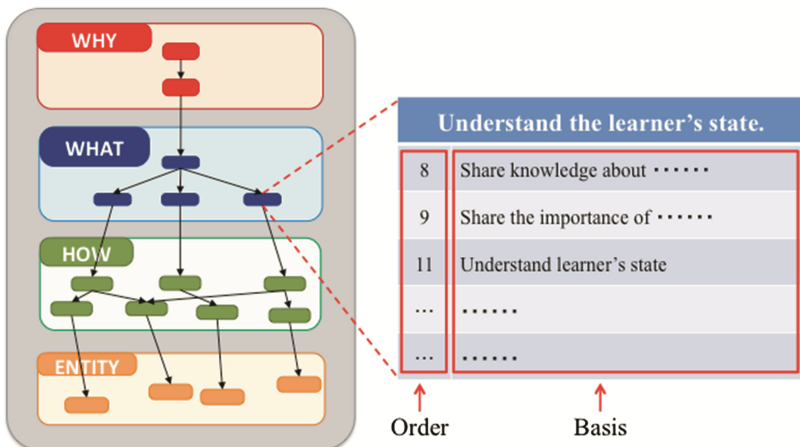


Fig. 5. Design solution model

3.2 Method for Analyzing the Co-design Process

Figure 6 shows a method for analyzing the co-design process. This method is based on the learning state map, which Kimita [6] proposed for analyzing 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.

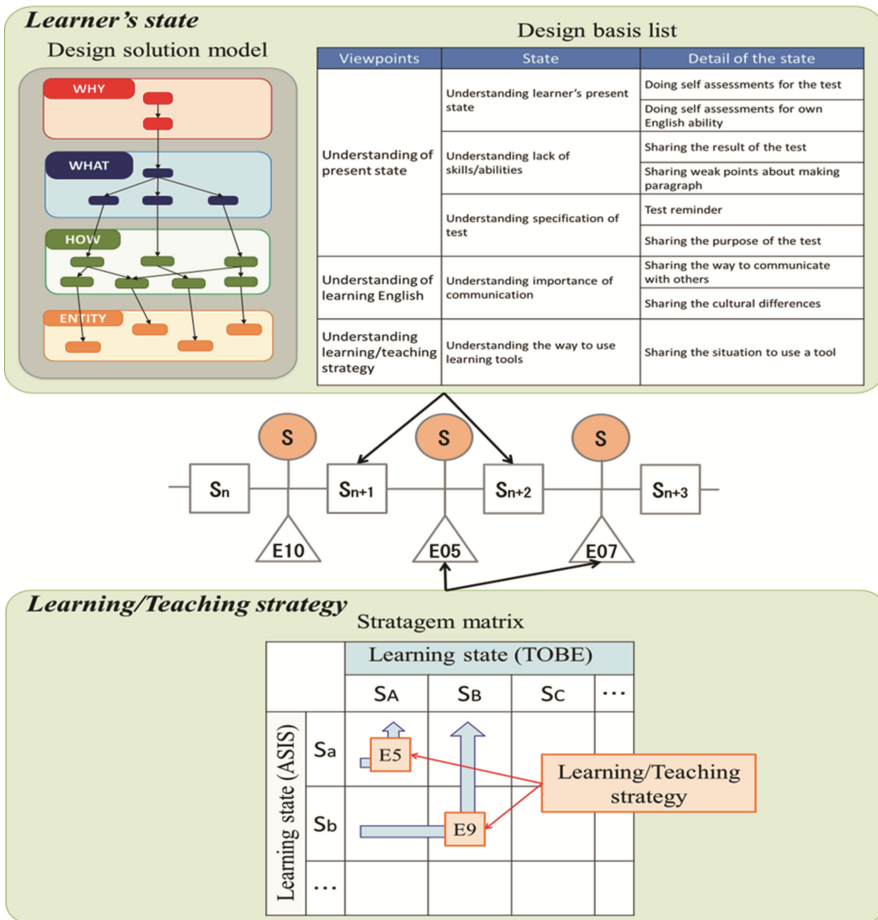


Fig. 6. Method for analyzing the co-design process

3.3 The Interpretive Structural Modeling Method

Interpretive structural modeling (ISM) is defined as a process aimed at assisting the human being to better understand what he/she believes and to recognize clearly what he/she does not know. Its most essential function is organizational. The ISM process transforms unclear, poorly articulated mental models of systems into visible and well-established models [7]. In this method, a set of different directly and indirectly related elements are structured into a comprehensive systematic model. The model so formed portrays the structure of a complex issue or problem in a carefully designed pattern implying graphics as well as words [8, 9].

By using ISM method, it makes possible to organize strategies to expand and formulate concrete design solutions while considering the state of the teacher and learner. It is possible to integrate and organize co-design strategies, design solution models that describe relationships among elements from multiple results of co-design process.

4 Application

In this paper, we conducted the application of the design solution model (Sect. 3.1) 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 application, 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 [10]. 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). In this application, we analyzed 9 out of 19 learners who had an improved score for learning motivation.

4.1 Design Solution Model

We present two instances as the results of the analysis. Figure 7 shows the results when a learner improved both the examination score and the learning motivation (as learner A). Figure 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. 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.

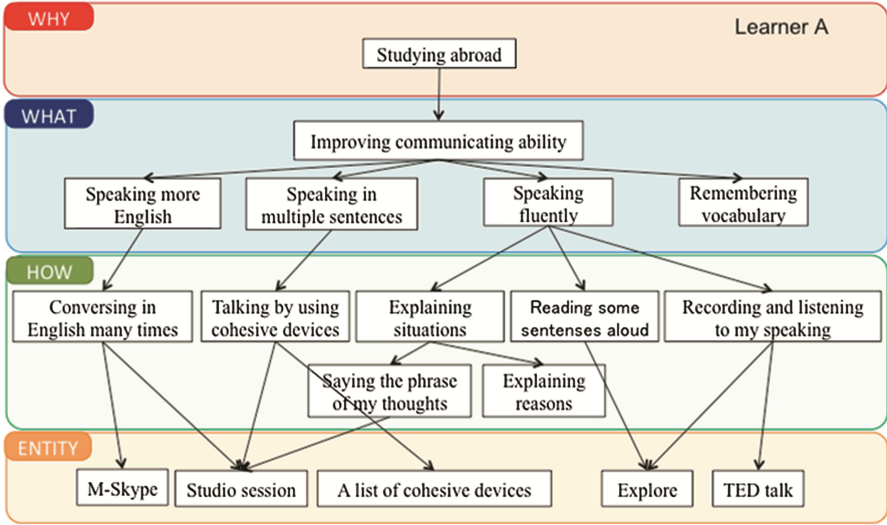


Fig. 7. A process of consensus building in the English lecture

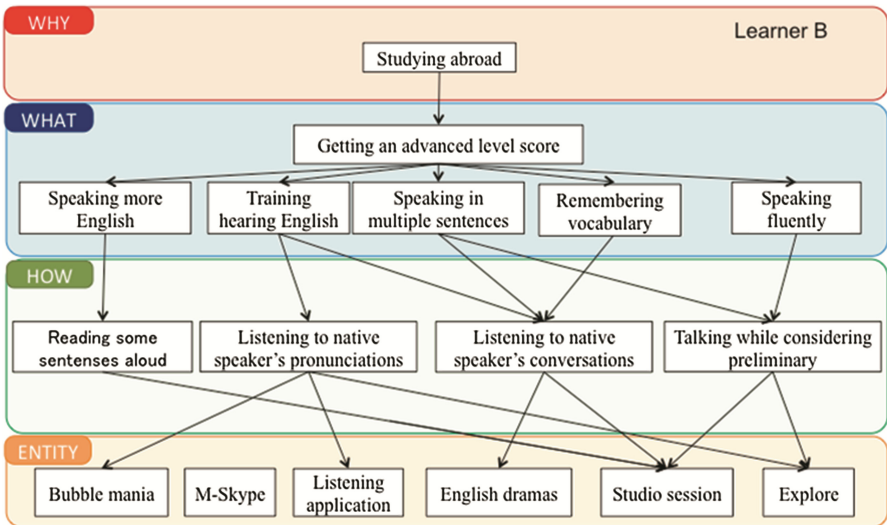


Fig. 8. The strategy for consensus building

Figures 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.

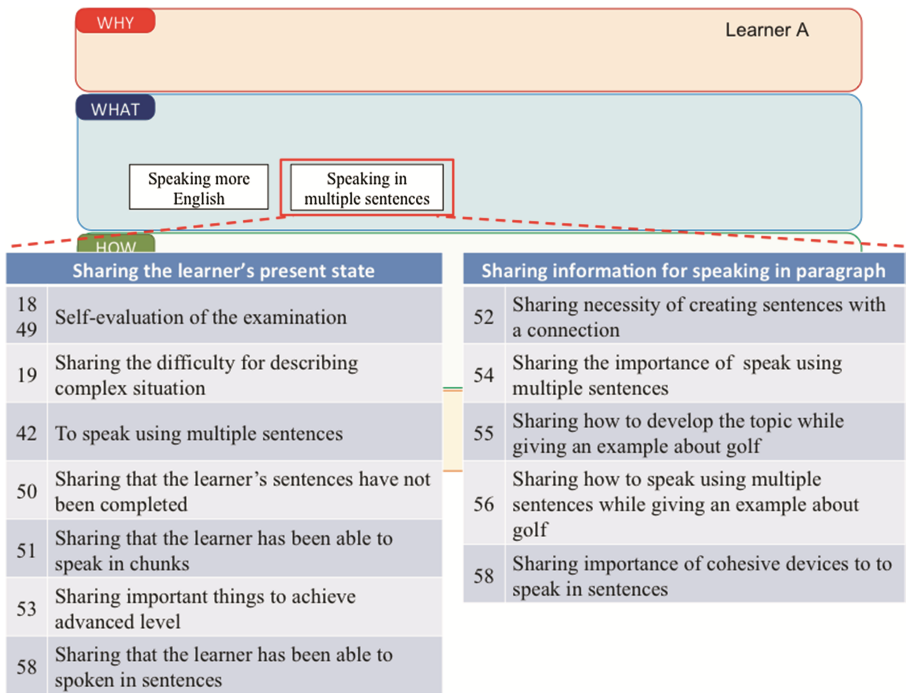


Fig. 9. Design solution and basis of learner A

4.2 Structuring the Results by the ISM Method

From the result of design solution model that is indicated Sect. 4.1, we built structuring models of consensus building between teacher and learner in co-design process shown in Fig. 11. We divided learners according to learning outcome; group A is consisted by 4 learners who improved examination score and learning motivation, group B is

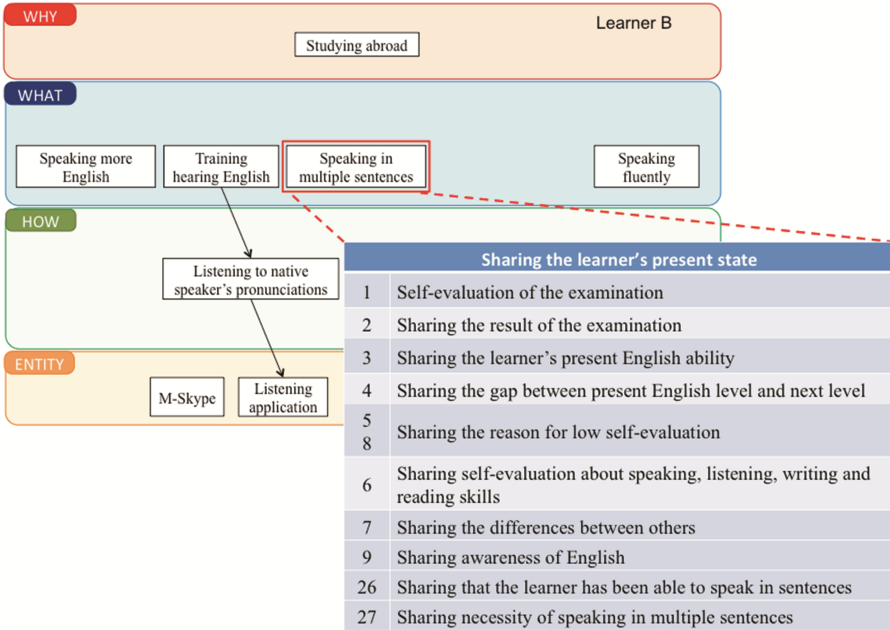


Fig. 10. Design solution and basis of learner B

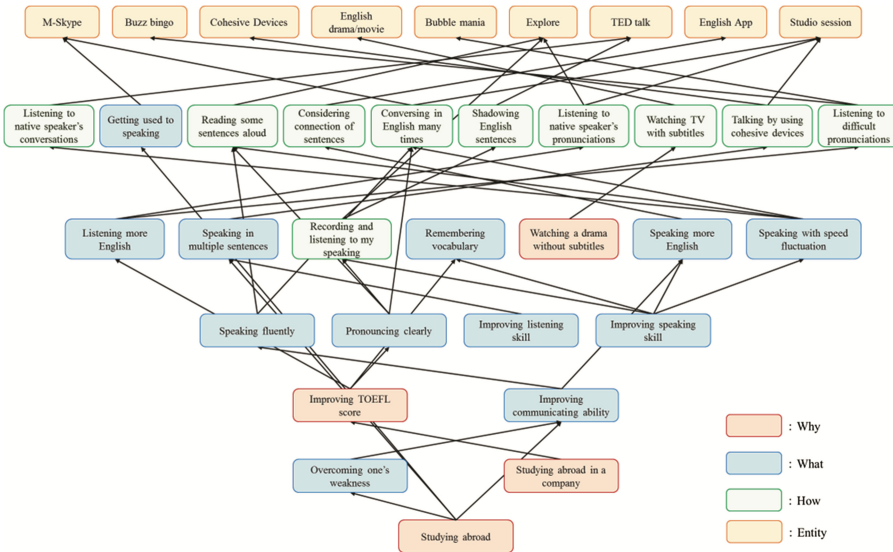


Fig. 11. Structure model of consensus building (Color figure online)

consisted by 4 learners who only improved learning motivation. Figure 11 shows a structuring model with results of 4 learners who improved examination score and learning motivation as a part of the result.

From those structuring models, we confirmed that it is possible to figure out relations between each design solution. In addition, we confirmed that it is possible figure out required design basis to expand a design solution in co-design process. Compare to group A and B, former ones built a consensus about many design solutions and shared concrete basis.

From those results, we found the way to co-design the class and expand design solution by using basis. For instance, at first, it is important for a learner who has a requirement about “Studying abroad” to initially build a consensus about the requirement through sharing learner’s TOBE state or daily life. Then, they build a consensus on the learning objective about “Overcoming one’s weakness” thorough sharing learner’s English ability or the result of the examination.

5 Discussion

From the results of the application, 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, it is difficult to organize those results because each student has different design solution and co-design process. To solve this problem, we organized those results for realizing effective value co-creation by ISM method. We expect that ISM method made it possible to figure out the way to co-design through consensus building.

6 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.

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