

Development of a Web-based Learning Program for Belief Conflict among Healthcare Workers

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Abstract

In healthcare, belief conflict causes various problems including reduced team quality, relationship difficulties, communication errors, and increased stress. The theory and practice of managing belief conflict in healthcare workers includes the Dissolution Approach for Belief Conflict (DAB). The purpose of this study was to develop a web-based learning program for DAB learning by healthcare workers. The Dick & Carey ID model was used as a reference for the development of the web-based learning program. We evaluated the prototype web-based learning program from two aspects: structure and content validity as learning materials. Amano's "checklist of e-learning materials to keep students motivated to learn" was used to evaluate the structure of the web-based learning program. The results showed that the web-based learning program met the elements required for e-learning materials, such as accessibility, truthfulness, usability, and learnability. Content validity was assessed by experts in the field of belief conflict research. After testing the prototype web-based learning program, experts were asked to complete a questionnaire survey. Based on the results of the questionnaire received from the experts in belief conflict research, discussions were held until both the author and experts were satisfied with the results. As a result, we created an interactive web-based learning program consisting of six chapters. This tool provides a resource for healthcare workers to learn how to manage belief conflict.

1. Introduction

Belief conflict is a significant problem in healthcare practice, arising among practitioners with differing opinions and values¹. Such conflicts can influence numerous issues, from creating deficits in shared goals² and diminishing trust in relationships³ to exacerbating stress responses and burnout⁴. In addition, they can lead to reduced quality of multidisciplinary collaboration, miscommunication, and limited information sharing⁵. In recent years, belief conflict has been identified as a health issue causing stress responses and occupational dysfunction^{2,6-8}. This problem manifests itself in different areas of rehabilitation medicine, such as acute², convalescent rehabilitation⁶, and hand therapy⁷, and impacts professionals ranging from doctors, nurses, pharmacists, occupational therapists, physical therapists, and speech therapists⁸. Consequently,

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belief conflict has a wide range of negative effects on occupational health. The belief conflict management reports provide a qualitative analysis of conflict cases encountered by healthcare workers in clinical settings, noting that people's efforts to resolve conflict vary widely and may not be successfully resolved^{2,6-8)}. This underscores the importance of addressing belief conflicts in healthcare.

Theories and practices tailored to address belief conflict among healthcare workers include the Dissolution Approach for Belief Conflict (DAB)¹⁾. Derived from phenomenology and structural constructivism, DAB is designed to assess and address the belief conflict experienced by healthcare practitioners¹⁾. DAB presents three ways to resolve belief conflict¹⁾. First, practitioners understand the differences in opinions and values through communication that is appropriate for the purpose and situation. Second, practitioners embrace the diversity inherent in people's opinions and values. Third, practitioners work together to achieve a common goal after acknowledging the differences in people's opinions and values. The DAB asserts that no individual's beliefs have inherent, absolute correctness. Instead, beliefs are relative constructions shaped by personal experiences, goals, and interests. The three ways presented by DAB are necessary for understanding the relativity of beliefs, and understanding the relativity of beliefs is important for resolving conflict.

We recommend that healthcare workers address belief conflicts not only because of their potential impact on mental health but also because such conflicts can impede effective teamwork among healthcare workers. Such barriers can affect the quality of healthcare services, with negative consequences for patients. Previous research has covered and reported on a range of topics, including scale studies assessing belief conflict³⁾, qualitative studies detailing the nature of belief conflict^{6,7)}, research on stress management related to belief conflict^{4,8)}, and case studies demonstrating countermeasures to belief conflict⁹⁻¹¹⁾. However, there remains a research gap in web-based learning programs in this area. Therefore, there is a need to develop a learning method that enables busy healthcare workers to learn DAB. Web-based interventions have shown advantages over traditional group-based training programs, in that they are cost-effective and allow learners to learn at their own pace^{12,13)}. We consider that a web-based learning program for the purpose of learning DAB would allow busy healthcare workers to learn at their own pace, without the constraints of time and location, and would contribute to the efficiency of learning. Therefore, the purpose of this study was to develop a web-based learning program for healthcare workers to learn DAB.

2. Methods

2.1 Research purpose

The purpose of this study was to develop a web-based learning program for healthcare workers to learn DAB. In this study, we evaluated a prototype web-based learning program before completing the final development of the program.

2.2 Research overview

The development process of the web-based learning program is shown in Figure 1. To ensure the quality of the web-based learning program, we referenced the Dick & Carey ID model of instructional design¹⁴⁾. Instructional design refers to the process of constructing a learning environment by applying theories and studies to improve the effectiveness, efficiency, and attractiveness of educational activities¹⁴⁾. The Dick & Carey ID model is a process model that clearly describes each step in the systematic development of educational materials. Therefore, we chose to use the Dick & Carey ID model for this study because it is a model that enables even inexperienced developers to develop teaching materials relatively easily. The development of the web-based learning program was carried out through a Plan-Do-See process: Plan involved clarifying the learning objectives and considering the teaching strategy; Do involved developing the learning content; See involved evaluating the prototype web-based learning program.

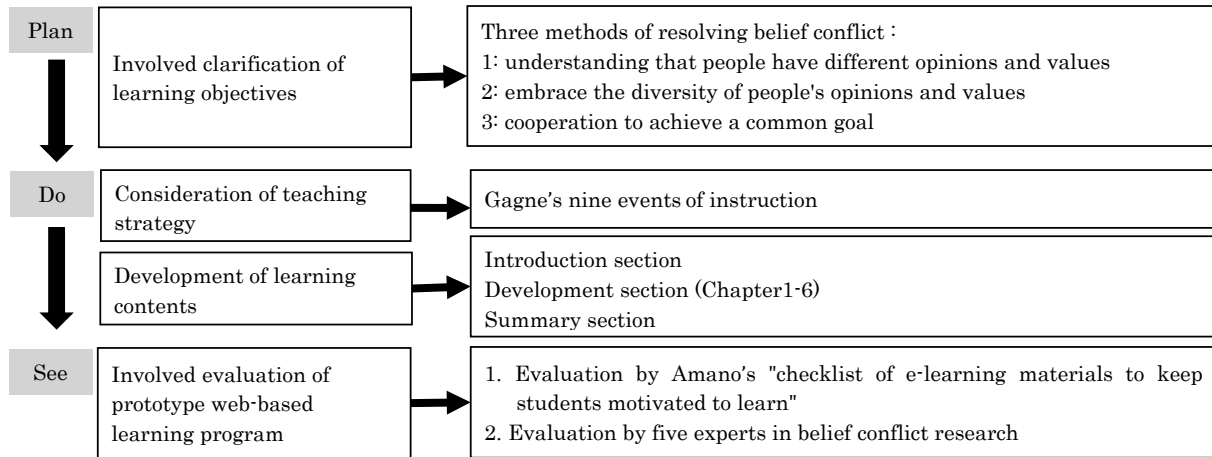


Figure 1 The development process of the web-based learning program

2.3 Clarification of learning objectives

The goal of this web-based learning program is to learn three ways of resolving belief conflict, as presented in the DAB. First, it emphasizes the understanding that individuals possess different opinions and values. Second, it promotes the acceptance of diversity in opinions and values. Finally, it promotes cooperation to achieve a shared objective. It is posited that cultivating these three attitudes can mitigate belief conflict¹⁾.

2.4 Consideration of teaching strategies

We used Gagne's¹⁴⁾ nine events of instruction to consider the teaching plan in the web-based learning program. By analyzing the structure of the best instructional materials ever created, Gagne proposed nine instructional events to promote learner learning (Table 1). The web-based learning program consisted of three sections: Introduction, Development, and Summary. The "Introduction" section was organized using elements from events 1, 2, and 3 of Gagne's nine events of instruction. Therefore, in the introduction, we presented a case study of belief conflicts among healthcare workers to increase the importance of learning, along with presenting the purpose of the web-based learning program. The "Development" section was organized using elements from events 4-8 of Gagne's nine events of instruction. To encourage learners to understand the three ways of resolving belief conflict, a narrative form of learning content was considered. We adopted a narrative in which a healthcare worker who is troubled by a belief conflict clarifies the conflict by using three ways of resolving the belief conflict. We tried to minimize the use of technical terms and used many illustrations. We also set up short questions to test learners' understanding of the learning content. The short questions were designed to get the learners to apply what they had learned in the web-based learning program to their own actual experiences of belief conflict. The learning program provider responded to the learners' answers to the short questions with comments to check their level of understanding and keep them motivated. The "Summary" section was organized using elements from event 9 of Gagne's nine events of instruction. Therefore, the summary included related information to support continued learning.

2.5 Development of learning contents

The researchers discussed the specific learning content of the "Development" section by referring to existing literature related to belief conflict. To facilitate the learner's understanding, we used the narrative of a healthcare worker who struggles with a belief conflict by using DAB. We set up six chapters in the "Development" section for learners to learn three ways to resolve the belief conflict using DAB. Chapters

Table 1 Gagne's nine events of instruction

1	Gaining attention
2	Information learning of the objective
3	Stimulating recall of prerequisite learning
4	Presenting the stimulus material
5	Providing learning guidance
6	Eliciting the performance
7	Providing feedback about performance correctness
8	Assessing the performance
9	Enhancing retention and transfer

1 to 3 explained that opinions and values that we may find unacceptable, are held by individuals with different backgrounds, and that we need to understand them. Chapters 4 to 6 explained that finding common goals with opposing parties and working together to achieve them, is a concrete way to rebuild broken relationships.

This was the prototype of the web-based learning program, with an "Introduction", "Development" (Chapter 1-6), and "Summary" section. The learning frequency of the web-based learning program was set at one chapter per week, and the learning time was set at a capacity that could be completed within 60 minutes. We used Google Classroom (<https://edu.google.com/intl/ja/products/classroom/>) as the e-learning system for this program.

2.6 Evaluation of prototype web-based learning program

We evaluated the developed prototype web-based learning program from two aspects as learning materials: structure and content validity.

2.6.1 Evaluation of the structure of the web-based learning program

The researchers evaluated whether the prototype web-based learning program had an appropriate structure to support learners' self-study. We used "Amano's checklist of e-learning materials to keep students motivated to learn" (<http://home.riise.hiroshima-u.ac.jp/~ten/ycl.html>¹⁵) for the evaluation. "Amano's checklist" includes questions on accessibility, truthfulness, usability, and learnability, which are elements that e-learning materials should meet¹⁾. The appropriate structure of a web-based learning program was defined as a state in which the program meets accessibility, truthfulness, usability, and learnability. The questions on accessibility, truthfulness, and usability were designed to check for design flaws that may discourage learning. The learnability questions are designed to check for design features that keep the learner engaged¹⁵⁾. The answers to the questions are two choices, "Yes" or "No." A "No" answer indicates that the question item needs to be reconsidered. By answering these questions, developers can identify areas for improvement in their e-learning materials¹⁵⁾.

2.6.2 Evaluation of the content validity of the web-based learning program

We evaluated the content validity of the prototype web-based learning program with the help of five experts in the field of belief conflict research. The experts completed the prototype web-based learning program on Google Classroom and answered a free-response questionnaire after completing the program. Based on the experts' comments about the appropriateness of the content, the researchers and experts discussed the evaluation, and the evaluation was completed when all parties were satisfied with the results.

3. Results

3.1 Evaluation of the structure of the web-based learning program

To evaluate the structure of the prototype web-based learning program, sixty-six relevant questions were answered. As a result, the respondents answered "No" to the four check items on accessibility and one check item on truthfulness, as shown in Table 2, and were asked to reconsider. The accessibility check items (1) and (2) asked whether alternative texts were available for learners with visual or hearing impairments. However, the answer to this question was "No", because users who need alternative text are not assumed to be the target audience of this study. We have also answered "No" to the accessibility check items (3) and (4). This is because Google Classroom itself, which is used as a learning platform, is not structured to require a site map or links. The truthfulness check item asked if we would update the content of our materials as needed. However, the answer was "No" because updating the web-based learning program was not planned for this study.

3.2 Evaluation of the content validity of the web-based learning program

Five experts in the field of belief conflict research provided comments and suggestions on the prototype of the web-based learning program and discussed areas for improvement. The details of the discussion are shown in Table 3. One of the experts pointed out that, regarding Chapter 1, the content was insufficient to achieve the purpose of the study in that chapter. We responded by explaining that we control the amount of information to avoid discouraging learners by giving them too much information in the early stages of learning, and that we add information in Chapters 2 and 3 if it is insufficient in Chapter 1. Another expert noted that additional case studies may be needed to deepen learning in Chapters 2 and 3. In response to this suggestion, we explained that we would not add any more examples because of individual differences in learner's learning rates. Some experts pointed out that learners may only have a superficial understanding of the content of Chapters 4 and 5 and may not be able to apply what they have learned. In response, the provider of the web-based learning program considered providing interactive support, monitoring the learner's level of understanding as appropriate, and providing feedback to help the learner understand. Some experts also reported problems with Google Classroom, such as the inability to download texts posted on the platform and the disorganized layout of the texts. This point may have been influenced by the Internet browsers used by learners. Therefore, we considered distributing the textbooks used for learning to individual learners, in addition to placing them on the platform. We also considered informing learners about recommended Internet browsers. We revised the prototype of the web-based learning program based on the above points and presented it again to experts.

As a result, after a single meeting, there was no disagreement on the content validity of the web-based learning program from any of the participating experts, and the evaluation of the content validity of the program was completed. The overall web-based learning program is shown in Figure 2. The target participants of our web-based learning program were healthcare workers who experienced strong belief conflict in the workplace. The "Introduction" section of the web-based learning program informs learners about the nature of belief conflict and the importance of learning strategies for managing it. Six chapters were included in the "Development" section of the web-based learning program to teach the three ways proposed by the DAB for resolving belief conflict. In Chapter 1, learners learn that people have various opinions and values, and that belief conflict arises when they are confronted with a person or situation in which their own ideas, opinions, and other beliefs are not applied. In Chapter 2, learners learn that in order to successfully deal with belief conflict, it is important not to make value judgments that one's own beliefs are right and the other's beliefs are wrong. In Chapter 3, learners learn that individual beliefs that cause belief conflict are valued by personal background factors such as experiences and interests. In Chapter 4, learners learn that in order to overcome belief conflict, it is important to search for a common goal between themselves and the person with whom they are in conflict. In Chapters 5 and 6, learners learn the

Table 2 Check items answered "no" on Amano's checklist and considerations

Category	Check items	Consideration
Accessibility	(1) There is alternative text for images.	The users who need alternative text are not assumed to be the target audience of this study.
	(2) For audio and video content, a text-only file that shows the contents of the content is provided separately.	
	(3) If there are multiple pages, a site map and a list of links are provided.	Google Classroom itself is not structured to require a site map or list of links.
	(4) Users can find the page they are on.	There are no plans to update the web-based learning program in this study.
Truthfulness	The contents of the materials are updated as necessary.	

Table 3 The points raised by the experts and the improvements to be made in response to them

Question No.	Contents	Answers from experts	Points of improvement
1	The purpose of Chapter 1 is to understand that people have different opinions and values depending on their goals and situation. Is the content of Chapter 1 appropriate to achieve this goal?	I feel that the contents of Chapter 1 alone are insufficient to understand that people have different opinions and values depending on their purpose and situations.	To achieve the purpose of Chapter 1, a lot of information is required for the learners to understand. The amount of information was controlled to prevent learners from losing their motivation to learn or, conversely, from not being able to understand. To achieve the goals of Chapter 1, the contents that could not be presented in Chapter 1 were presented in Chapters 2 and 3.
2	The purpose of Chapters 2 and 3 is to learn concrete ways to accept the diversity of people's opinions and values. Are the contents of Chapters 2 and 3 appropriate to achieve this goal?	To study the contents of Chapters 2 and 3 thoroughly, I think some more examples are needed.	Since it is expected that the learning speed of the learners will vary from person to person, we will not add more examples.
3	The purpose of Chapters 4, 5 and 6 is to learn the importance and specific method of working together to achieve common goals, while recognizing differences in people's opinions and values. Are the contents of Chapters 4, 5 and 6 appropriate to achieve this goal?	Feedback is necessary because I think there are participants who reflect their actions based on the goals they have set for themselves. There may be cases wherein participants only have a superficial understanding of the program or may not be able to apply what they have learned.	We will monitor the learner's understanding during the learning process and provide interactive support through feedback.
4	Did you encounter any problems while using Google Classroom?	The text could not be downloaded. The layout of the text was disordered and there were overlapping characters in the text.	All texts will be converted to PDF before being distributed to the learners. Considering the possibility that the type of web browser may have an effect, we will determine the recommended web browser and inform the learners.

Week 1	Introduction	Understand the nature of belief conflict and the importance of learning strategies for managing it.
Development		
Week 2	Chapter 1	Learners learn that people have various opinions and values, and that belief conflict arises when they are confronted with a person or situation in which their own ideas, opinions, and other beliefs are not applied.
Week 3	Chapter 2	Learners learn that in order to successfully deal with belief conflict, it is important not to make value judgments that one's own beliefs are right and the other's beliefs are wrong.
Week 4	Chapter 3	Learners learn that individual beliefs that cause belief conflict are valued by personal background factors such as experiences and interests.
Week 5	Chapter 4	Learners learn that in order to overcome belief conflict, it is important to search for a common goal between themselves and the person with whom they are in conflict.
Week 6	Chapter 5	Learners learn the importance of sharing common goals between themselves and the person with whom they are in conflict.
Week 7	Chapter 6	
Week 8	Summary	Learners are provided with a review of the content of Chapters 1 to 6 and information on reference materials to support further learning.

Figure 2 Overall web-based learning program

importance of sharing common goals between themselves and the person with whom they are in conflict. The "Summary" section of the web-based learning program provides learners with a review of the contents of learning from Chapters 1 to 6, as well as reference materials to support further learning. The duration of the learners' participation in the web-based learning program was eight weeks. The frequency of learning was one chapter per week, and each chapter could be completed in 60 minutes or less.

4. Discussion

In this study, we developed a web-based learning program with interactive features to achieve the purpose of developing educational materials for learners to learn DAB. The Dick & Carey ID model provided clear guidelines for the construction of the web-based learning program, which we developed and assisted in its smooth development. By presenting clear learning goals and referring to Gagne's nine events of instruction to develop a learning plan, we consider that we have created a web-based learning program with a structure that encourages learners to learn.

Two issues were considered in the development of the web-based learning program. The first is whether the structure of the web-based learning program is appropriate. We considered that learning a web-based learning program that is appropriate for the learner will help the learner continue learning on his or her own. Amano's checklist was used to examine whether the specifications were suitable for supporting learning as a teaching aid. After examining the 66 items in the checklist, no deficiencies were noted in the content. Therefore, we judged that the prototype web-based learning program met the elements of accessibility, truthfulness, usability, and learnability through e-learning materials. Since this study defined the appropriate structure of a web-based learning program as the state in which the program meets accessibility, truthfulness, usability, and learnability, the web-based learning program was determined to have an appropriate structure. The second question was whether the content validity of the web-based learning program was ensured. We considered that learning a content validated web-based learning program would help learners gain a sound understanding of DAB, a theory for overcoming belief conflict, and acquire knowledge that could be used in practice. We discussed the content validity of the prototype

web-based learning program with experts in the field of belief conflict research. A central topic of discussion was the need to further enrich the learning content to help learners understand DAB. However, we were concerned that increasing the amount of content would increase the cognitive load on learners and possibly lead to decreased motivation. Therefore, we decided to provide learners with feedback based on their progress. Feedback was provided in the form of comments on learners' answers to short questions that assessed their understanding of the study's content. We considered that having the opportunity to interact with learners would enable interactive communication and help correct their lack of understanding or misunderstanding. In addition, experts in belief conflict research provided pointers regarding the use of Google Classroom as an e-learning platform. One belief conflict researcher noted that he had tried to download the learning content materials on the platform to print them out, but was unable to do so. We realized that this point might cause some learners to consider downloading the learning content on the platform and using it as a paper-based learning resource. Therefore, we considered converting the learning content to PDF format and distributing it to the learners. We consider that this will make the learning environment easier for learners who want to use paper-based learning materials.

One of the problems pointed out in the design of online learning materials is the loss of contact between the instructor and the learners and between the learners themselves¹⁴⁾. We considered that the issue of loss of personal contact could be addressed by providing interactive support that monitors the learning situation and, if necessary, contacts the learner to promote understanding of the learning content. In addition, the issue of maintaining learner motivation has been raised¹⁴⁾. To address this issue, we presented our learning content in the form of a narrative about a belief conflict situation that healthcare workers can easily relate to. In addition, to make learners experience the usefulness of the learning content in the real world, the short questions presented after the learning were designed to overcome the belief conflict experienced using the content learned in the web-based learning program. We considered that these strategies would maintain learners' motivation for the web-based learning program.

5. Conclusion

The purpose of this study was to develop a web-based learning program for healthcare workers to learn DAB. The developed web-based learning program met the factors of accessibility, truthfulness, usability, and learnability and was found to be an appropriate structure for an e-learning resource. In addition, by receiving advice and suggestions on the web-based learning program from experts in the field of belief conflict research, a more appropriate course system with enhanced learning content could be developed for learners to learn DAB. In the future, it will be necessary to conduct a preliminary study to clarify the learning effectiveness of the web-based learning program developed in this study for healthcare workers facing belief conflict.

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