Instructors Playing the Role of Developer and Implementer: Impacts on Material Development

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Background

This work-in-progress reports on the first 1.5 years of data collection within a three-year project. The research is focused on gaining a better understanding of the Implementation Gap. The implementation gap refers to the copious number of research-based innovations and their lack of widespread use in classrooms. Students are directly affected by this lack of widespread use as they are not being provided with the best tools available. Therefore, a better understanding of the implementation gap could lead to a greater use of the innovations and ultimately benefit more students. For this research, "innovation" will be defined as any new material or instructional strategy that an instructor uses for the first time.

Previous research has identified that instructors are typically aware of innovations but fail to implement them in their classrooms[1]. Of those who do implement them in their classrooms, it was found that nearly one third discontinue use after the first try[5]. To support continued use of these innovations in classrooms, it is thought that instructors need to be included as an active participant in the design and development of the innovation[6].

The implementation gap is often investigated as a difference in goals between two separate groups, the developers and the implementers (for example Hazen et al., 2012 and Henderson & Dancy, 2011). But many developers are frequently also implementers. Therefore, this research aims to observe instructors in their role as both developer and implementer in order to identify key differences between development and implementation that can impact adoption.

Purpose

The purpose of this paper is to identify key differences in the attitudes and beliefs of instructors between two material development workshops spaced approximately one year apart.

Methods

Workshops

To date, two summer workshops have been held where instructors from the Pacific Northwest have been invited to participate in the co-development of materials for a Mechanics of Materials course. A majority of instructors from year one returned during year two while five instructors attended the workshop for the first time during year 2 (Table 1).

Table 1. Comparison of participants from year 1 workshop and year 2 workshop.

	# of Participants	Female/Male Ratio	2yr/4yr college ratio
Year 1: 2014	17	6/11	9/8
Year 2: 2015	18 (13 returning, 5 new)	7/11	9/9

The Year one workshop was centered around the instructors working in groups on 1 of 5 topic areas. They were asked to produce a detailed outline of the materials they were developing, including how it would be used in the classroom. Groups frequently produced student worksheets as well as instructor worksheets that accompanied the physical innovation. Innovations consisted of hands-on manipulatives such as pool noodles to help demonstrate key concepts that relate to Mechanics of Materials.

Feedback from the first workshop helped to design the second year's workshop. With this feedback, groups were assembled by topic areas that the instructors brainstormed together during the initial portion of the workshop. The groups then worked together further developing an idea about the given topics. Groups were given more freedom to create what they wanted and given the option of how to present it to the larger group (and ultimately a classroom). These ideas once again included hands-on manipulatives similar in concept to year 1 but also included short videos that could be watched by students or instructors that demonstrated a concept using manipulatives.

In comparing the Year 1 and Year 2 workshops, it can be seen that the input from the instructors helped reshape the format of the workshop between the years but the same underlying principles existed: collaboration, interest in student understanding, and material development. With these core principles remaining the same across the workshops, we can then compare how the instructors' attitudes and beliefs changed throughout this timeframe.

Theoretical Framing

For this research, the Concerns Based Adoption Model (CBAM) has been utilized to compare and contrast how the instructors' beliefs and attitudes towards the innovation changed over time[2]. CBAM is a well-researched educational model created in the 1970's ad 1980's that helps depict the change process in an educational setting. There are three main components of CBAM; Levels of Use, Stages of Concern, and Innovation Configuration. Each component has a specific use and this research utilizes the Stages of Concern as it depicts how the beliefs and attitudes of an individual change over time in relation to the individual's use of the innovation.

The Stages of Concern range from no interest or involvement to highly involved and vested in the innovation. The stages are further explained in Table 2.

Using the descriptions of each Stage of Concern cited in Table 2, transcripts from the audio recordings of the workshops were analyzed and stages were assigned to segments of the transcripts. Segments ranged in length with a new Stage of Concern being assigned anytime one of the participants shifted to a new concern. For example, if a participant was talking about how the innovation would impact student learning and then transitioned to being concerned about finding the materials to create the innovation, then the first segment would be labeled (or coded) as a Consequence concern while the second segment would be labeled as a Management concern. This coding scheme resulted in 680 clear concerns cited during the 2014 workshop and 523 clear concerns during the 2015 workshop.

Table 2. Summary of CBAM's Stages of Concern. Adapted from Hall & Hord (2006).

Stage 0 Awareness	Participant is not concerned or involved with the innovation.
Stage 1 Informational	Participant is generally aware of the innovation but has not considered the demands or requirements of its use.
Stage 2 Personal	Participants' concerns are about their ability to meet the demands of the innovation.
Stage 3 Management	Participants' concerns are focused on efficiency, organizing, managing and scheduling.
Stage 4 Consequence	Participants are concerned with how the innovation will impact student understanding.
Stage 5 Collaboration	Participants are concerned about collaborating with others in their use of the innovation.
Stage 6 Refocusing	Participants are concerned with how to improve the innovation for future use.

Results-to-date

Figure 1 compares the concerns of instructors from workshop 1 (2014) to the concerns during workshop 2 (2015).
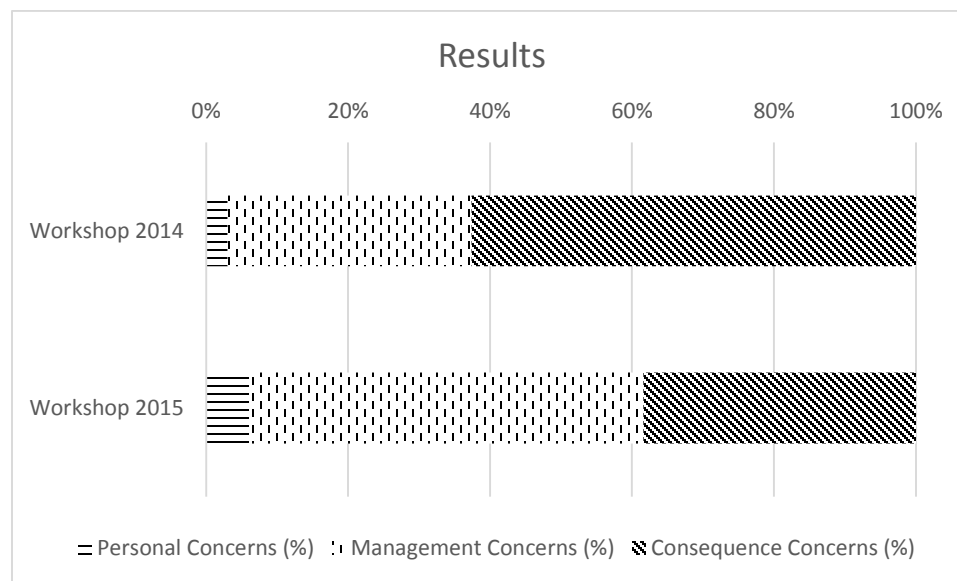

Figure 1. Comparison of the instructors' concerns cited in workshop 1 (2014) and workshop 2 (2015).

The overall trend of how the concerns of the instructors changed can be better seen in graphical form (Figure 2) which shows how Consequence concerns were the most commonly cited type of concern during workshop 1 and Management concerns were most commonly cited during

workshop 2. Overall, there appears to be a greater incident of lower level concerns during the second workshop in comparison to the first workshop.
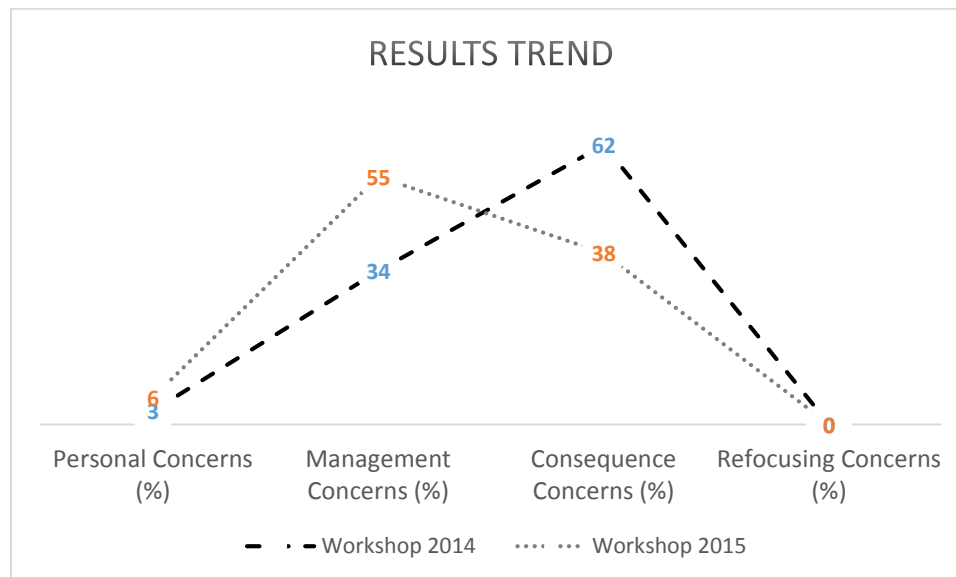

Figure 2. Workshop 2 had a greater occurrence of Management concerns indicating a downward shift from workshop 1 where Consequence concerns were the most frequently cited.

Discussion/Conclusion

At this point we are considering two interpretations of these findings. The first interpretation emphasizes the participants' role as both developer and implementer. Participants had a chance to implement the materials they created during the 2014 workshop and therefore had gained valuable insight into the hurdles that occur during implementation. This insight could have been used during the 2015 workshop to inform the development of new materials and ultimately affect their concerns.

The second interpretation is that despite the core principles of the two workshops remaining the same, the situational differences were great enough to impact the concerns of the instructors. For example, during the first workshop, instructors were given the option to ask a researcher to go buy materials while during the second workshop, a range of materials were readily available for the instructors to use. Theorizing how an innovation might work during the first workshop could have led to fewer management concerns (recall, these focus on use of the innovation) and a greater number of Consequence concerns (which focus on student outcomes). In comparison, during the second workshop, instructors were able to physically manipulate the materials and test out their ideas which could have led to a greater focus on the use of the innovation (Management concerns) and less of a focus on students (Consequence concerns).

Interviews for the second round of implementation are currently underway which will provide further details about how the same group of instructors is affected when they both design and implement innovations. Upon completion of the project in the next year and a half, a detailed and comprehensive picture of how instructors change when they are both the developer and

implementer will be developed and action items of how to assist in narrowing the implementation gap will be identified.

Acknowledgements

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