Towards a Model Supporting Educational Change

Morag S. Gundy and Marie Josée Berger

***Abstract*—This article examines models of educational change looking at integration of innovations during change, and how innovations are used and implemented in classrooms. The theoretical discourse that surrounds change has been addressed in different ways but has not been deeply analyzed in terms of dealing with patterns of change and implementation. Therefore the analysis presented in this article identifies a number of models, focuses on their different contributions to educational change, and will identify a powerful model for supporting educational change.**

***Index Terms*—Change, implementation, theory, models, CBAM.**

I. Introduction

Fullan & Park state that implementation is a multi-dimensional process. Different types of change are necessary in order to ensure the integration of innovation, including: the use of materials; and, the introduction of new teaching approaches. They predicted that teachers who changed in only one or two dimensions would achieve only minor changes in their classrooms [1], [2]. Connelly & Clandinin [3] further reinforced the importance of the teachers' role, arguing that teachers were central figures in change, and that changes in teacher perceptions must take place if change was to occur. Researchers [4]-[7] identified the need for studies that focus on teachers' understandings or perceptions of integrating innovations.

In searching for an analysis of a theoretical discourse of change, a number of models for educational change were identified and examined. This discourse sought models that would address or be capable of addressing the following: change initiated and implemented by individual classroom teachers in their subject area with little or no external assistance; the importance of the role of the individual teacher in the integration of innovation during change; how teachers actually use innovations in their classrooms; and, how the teachers would implement a poorly structured innovation requiring multiple, simultaneous changes.

This article examines the theoretical discourse that surrounds change, the implementation of innovations, and a comprehensive list of models. The discourse will focus on one model, the Concerns-Based Adoption Model (CBAM) including how it can be pertinent to how teachers implement the process of change.

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II. Literature Review

A. Change, Implementation: Theory and Models

It has been estimated that researchers have developed at least 50 models for studying change [8], yet no pattern of systematic development of knowledge about change and the implementation of innovation emerged from the 1950s to the 1990s. There was a recurring pattern of new models developed for different policy initiatives and the use of these models for research in schools and school systems, but these models resulted in little actual change in classrooms [9]. From these 50 models, ten models were selected because they have been identified in the literature as significant models in the research on change [9]-[13]. The ten models selected for consideration as a theoretical discourse for this article were: The Research, Development and Diffusion Model (RD&D); the Center-Periphery Model (CP); the Organizational Development Model (OD); the Concerns-Based Adoption Model (CBAM); the Problem Solving Model; the Linkage Model; the Rand Change Agent Model; the Innovation Profile Model (IP); the Denver Curriculum Revision Model; and, the Eight-Year Study Model.

B. Change Models

From the models listed as externally motivated, top-down models, four models were selected: the Research Development & Diffusion Model [14]; the Center-Periphery Model [15]; the Organization Development Model [16]; and, the Concerns-Based Adoption Model [17]. As explained above, in these models it is assumed that the motivation for change is external to the teacher. An interactive, middle-up change model was also selected, the Problem Solving Model [11]. The assumption of an interactive middle-up model is that the motivation for change is external to the teacher, but there will be some input by teacher practitioners after the innovation is developed by experts.

C. Implementation Models

After selecting five change models for further study, this article examines a number of models identified in the literature as implementation models. According to Cho [10], perspectives on the implementation of innovations can be arranged on a continuum depending on amount of teacher input and the complexity of the decisions teachers are required to make (see Table I).

D. Implementation Models: Fidelity Perspective

Prior to 1970, teams dominated by scientists developed science curricula for the schools and it was assumed that teachers would implement the curriculum provided to them in their classrooms [18]. Teachers would use a simple pattern of decision-making focused only on effective implementation of

the innovations provided by educational authorities, usually the Ministry and the school board [13].

TABLE I: PERSPECTIVES: IMPLEMENTATION MODELS

Fidelity	**Mutual Adaptation**	**Enactment**
Research Development & Diffusion	Rand Change Agent	Denver Curriculum Revision
Linkage	Innovation Profile	Eight Year Study
Concerns-Based Adoption	Organizational Development	
>>>> Increasing teacher input >>>>		

Adapted from Cho, [10]

E. Implementation Models: Mutual Perspective

Models with a mutual adaptation perspective are characterized by an externally imposed middle-up dynamic [10]. This perspective requires that the external authorities allow modifications to the innovation that has been designed by external experts for the classroom and also requires more complex decision-making by teachers as they reshape or adapt the innovation for their respective classrooms [13]. This perspective recognized the complexity of the classroom settings for which the curriculum was intended.

F. Implementation Models: Enactment Perspective

The third implementation perspective is the enactment perspective. This perspective is driven by an internally imposed, bottom-up dynamic [10]. Teacher decision-making is regarded as being complex, focused on what will or will not be implemented, and how innovation will be implemented in their classrooms. In the enactment perspective, implementation of innovations in most subject areas and grade levels became more complex. Unlike many models which focused on school systems or schools, models in the enactment perspective focused on involving teachers in implementing innovations in their classrooms [13]. This brought the list of models considered for this article to ten.

In summary, the selection of the ten models re-introduced the concepts of externally driven top-down dynamics, mutual adaptation middle-up dynamics, and bottom-up enactment dynamics. It should be noted that these concepts are not mutually exclusive and models do appear in more than one classification. For example, CBAM appears as both a model for studying change and a model for studying implementation. In fact, the body of research in North America, Europe and Australia based on this model indicates that it performs beyond the original parameters of its developers [9].

G. The Concerns-Based Adoption Model (CBAM)

The Concerns-Based Adoption Model (CBAM) was developed by Hall & Loucks [17] and is associated with the University of Texas at Austin. It is identified as a model to study externally motivated, top-down change [11] facilitated by an agent who understands the innovation being implemented from the point of view of the teachers [19]. CBAM is considered primarily a descriptive and predictive model [9] which can help teachers, and those who assist teachers, in implementing innovations by helping teachers develop effective strategies for their classrooms. The model originally had three diagnostic tools and we will deal with each of them individually: Stages of Concern (SoC); Levels of Use (LoU) and Innovation Configuration (IC).

This model identifies various levels of teacher concerns about an innovation (Stages of Concern), and describes teacher behaviour during the implementation process (Levels of Use). A third component of CBAM, Innovation Configuration, examines how the teacher is using the innovation in the classroom, and recognizes how different an innovation may appear to researchers when implemented by individual teachers in their own classroom. Organized as a rubric with ideal, acceptable, and unacceptable categories, an Innovation Configuration might include a number of factors such as: the necessary resources and conditions to implement the innovation, six to eight characteristics of the innovation; and, descriptions of how the characteristics have been implemented [20].

Horsley & Loucks-Horsley [20] state that CBAM is based on a number of assumptions: 1) change is a process rather than an event that occurs when teachers are given an innovation to implement; 2) the process is a personal experience, and teachers experience the change in their own unique way; 3) the result of a successful implementation of an innovation requires a change in the classroom practices of individual teachers; 4) individual teachers must change before schools or school systems can change; 5) teacher change is a developmental process that occurs in stages and which involves not only growth in knowledge and use of skills, but also the development of a set of personal feelings towards the innovation. For successful integration of an innovation to take place, initial activities should thus be directed toward meeting the concerns of the individual teachers. The originators of this model have noted that it is difficult for researchers to ascertain teachers' perceptions about the integration an innovation and designed CBAM to assist in identifying the nature of teachers' concerns.

Hall *et al*. [21] maintained that the individual teachers make decisions about degrees of acceptance or rejection of specific innovation, and they do so, not because of the public reasons usually given, but because of the specific concerns that they develop as they become involved with the innovation [11].

The CBAM model conceptualizes teachers' concerns as having seven major focuses which constitute a developmental sequence [22] that can be metaphorically represented as climbing a set of stairs while exploring the teachers' perceptions of their experiences)see CBAM: Seven Stages of Concern below):

CBAM: Seven Stages of Concern

1) *Refocusing*: Is there anything else that is better?

2) *Collaboration*: It's working fine, but how do others do it?
3) *Consequence*: Is this working? Is it worth it?
4) *Management*: How can I master the skills and fit in?
5) *Personal*: how does this impact me? What is my plan?
6) *Information*: How does it work?
7) *Awareness*: what is it?
8) *Unrelated* Concerns

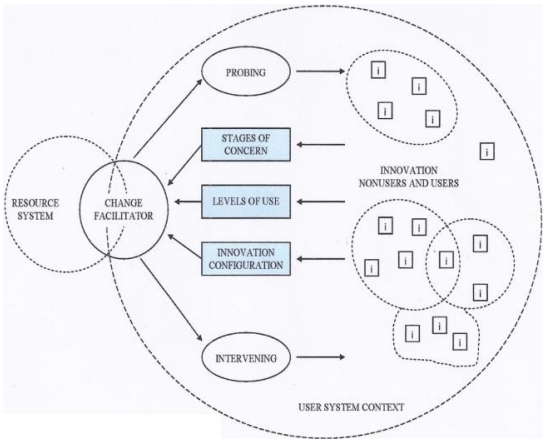
Adapted from Sweeney [23]

The Concerns-Based Adoption Model (CBAM) (Hall *et al*., 1975) is also identified as an implementation model with a fidelity orientation [10]. As an implementation model, the Levels of Use of the innovation (LoU) portion of CBAM can be used to study the performance of the teachers while using the innovation. To study the fidelity of the implementation, Levels of Use collects information from teachers on how they are using the innovation in their specific classrooms and the descriptions they provide of their behaviour during the implementation. Levels of Use describe the teachers' developmental progression in acquiring new skills as they attempt to use the innovation (see CBAM: Six Levels of Use below). The model acknowledges the possibility of non-utilization of the innovation and identifies six observably different types of behaviour and patterns of use.

CBAM: Six Levels of Use

1) *Renewal*: where the teachers are re-evaluating the quality of their use of the innovation. They are examining modifications of the present innovation, new developments in the field, and exploring new goals for themselves and the system.
2) *Integration*: where the teachers are combining their personal efforts to use the innovation with the related activities of their colleagues to achieve a collective impact on students within their sphere of influence.
3) *Routine and Refinement*.
   - *Routine*: the teachers' use of the innovation has stabilized. Few changes are being made on an ongoing basis, but little preparation or thought is being given to improving the use of the innovation or the consequences of using the innovation.
   - *Refinement*: the teachers are varying the use of the innovation to increase the impact on the students in the classroom. Variations are based on the teachers' knowledge of short and long-term consequences for the students' learning.
4) *Mechanical use*: The teachers are focusing most of their efforts on the short term, day-to-day use of the innovation and have little time for reflection. Changes are made more to meet the needs of the teachers than for the benefit of the students. Teachers are attempting to master the tasks required as they teach, often resulting in disjointed and superficial use of the innovation.
5) *Preparation*: where the teachers are preparing for the first use of the innovation.
6) *Orientation*: where teachers are acquiring knowledge of the innovation and are exploring its values and its demands upon them and their classrooms.
7) *Non-use*: where the teachers have little or no knowledge of the innovation, no involvement with the innovation and are doing nothing toward becoming involved in it.

Adapted from: Hall *et al*., [24]; Hall & Hord [25].



Source: Hall & Hord [25].
Fig. 1. The Concerns based adoption model.

As we view it, CBAM (see Fig. 1) focuses on the perceptions and lived experiences of individual teachers as they encounter innovation, and operates as a change model (SoC), and an implementation model (LoU). As well, CBAM can be used to describe how the innovation looks to researchers when implemented by individual teachers in their classrooms. For all these reasons, we consider CBAM [25] a helpful conceptual framework, but a model that we amend as followings.

III. Discussion

Despite the volume of research based on this model, a number of criticisms of CBAM's functioning have not been resolved. Researchers have found integrating data provided by the first three diagnostic tools, Stages of Concern, Levels of Use, and Innovation Configuration, has proven difficult [9]. In addition to this concern, the general pattern of use of this model has been described as follows: most CBAM research uses only the first diagnostic tool, Stages of Concern about a change; a few research studies use the second diagnostic tool, Levels of Use; even fewer research studies use both the first and second diagnostic tools: and, almost none of the research uses the third diagnostic tool, Innovation Configuration. Very few research studies actually use the entire CBAM model to study the integration of technology [26].

These researchers make two other relevant critiques of CBAM research: almost all studies are short in duration; and the research studies document successful modification of lower-level concerns using CBAM, but do not document successful modification of higher-level concerns. There is a lack of empirical research on the higher levels of use in CBAM [27].

Concerns have also been raised that CBAM might best be used for investigating well-structured innovations, rather than poorly structured innovations. Technology, as an example, is not a well-structured innovation but a poorly structured innovation, a constantly changing innovation that presents teachers with a continuous series of problems concerning implementation and diffusion [26]. In addition, academics have criticized the reliability and validity of quantitative results obtained using CBAM when, as the quantitative data collected often indicates, large numbers of teachers decide not to integrate the innovation. In response to such criticism, a

fourth, and last dimension, qualitative interviews, was added to the original CBAM model [17] to augment the quantitative data the model provided.

In summary, in most CBAM research only part of the model is used: or CBAM is used and an amended model is presented at the end of the study [27], [28]; or CBAM is modified prior to the study [29]-[33]; or CBAM is augmented by another model [34], [26], [19] in order to study different types of educational change. We did not select CBAM for its original quantitative or diagnostic purposes; instead, we developed rubrics for a qualitative analysis of teacher perceptions (SoC), for their experiences with the complex changes they undertook (LoU), and what the integration of laptops looked like when new teaching materials were implemented in their individual classrooms (IC), and, we chose to use the fourth dimension added to CBAM, interviews with teachers. This use of CBAM maintains the focus on the perceptions of individual teachers undertaking change; and, emphasizes the importance of listening to, and hearing what the teachers are saying about their experiences [35].

CBAM, as modified with teacher interviews and rubrics for qualitative analysis of teacher concerns, their experiences implementing an innovation, and what the innovation looked like when integrated in their classrooms, recognized the importance of teachers' perceptions about what is encountered during the implementation of an innovation and the interpretations the teachers ascribe to what they experienced [36]. Quantitative researchers [4], [37] and qualitative researchers [7], [38], [39] have recommended that teachers' perceptions about changing instructional practices, their role during changes, and how they actually use the innovation in their classrooms should be documented. The different models discussed in this paper, including CBAM, have given an overview of their possible use to assess the implementation of change.

IV. Conclusion

After examining different models of change in terms of their ability to support change in classrooms, CBAM [24] seems to be the most robust, empirically grounded model developed by researchers in the area of educational change [9]. CBAM does focus on individual teachers' perceptions about change, whether the innovation was actually being used in the classroom, and what the innovation looks like when integrated in the classroom.

Although there have been criticisms about the functioning of CBAM, the later addition of qualitative interviews, augmented the quantitative data the first three diagnostic dimensions of the model provided [9]. Qualitative data acknowledges that teachers construct much of what they learn and understand as a result of their professional experience [40]. Adding a qualitative dimension to CBAM as it was originally designed by its developers, provided a more powerful model for supporting educational change due to its ability to focus researchers and supervisors on individual teachers, on whether the innovation was being used in the classroom, and what the innovation looked like when implemented in classrooms.

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