

Teachers' intuitive approaches to curriculum design

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Teachers' intuitive approaches to curriculum design: Understanding decision-making while creating ict-rich learning activities for early literacy

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Abstract: This study explored the process of teachers' collaborative decision-making when designing curriculum material to be used in a ICT rich learning environment for early literacy. In this study, 9 teachers voluntarily participated. This study used semi-structured interviews and concept maps to explore existing orientations towards teaching early literacy in kindergarten with ICT. These results were compared and contrasted with a discourse analysis on the concerns that were raised during the collaborative team discussions when designing a learning environment for early literacy. The findings of this study show that when designing, their discussions mainly pertain to practically relevant issues such as implications of the program in practice, aesthetics of the material and features in the content itself.

Introduction

Various studies have shown that classroom practices were positively impacted when teachers were engaged in designing curriculum material such as lesson planning and content (George & Lubben, 2002; Hoogveld, Paas, & Jochems, 2005). This promising perspective has also been used in studies on the design of effective ICT-classroom integration. Engaging teachers as designers of lesson material is desirable for several reasons. First of all, designing learning material creates a sense of ownership with the teachers. Second, the learning material is shaped with unique insights from practice. Teachers know their classroom, children and context better than anyone outside of their classroom (Ben-Peretz, 1990). Third, especially in Dutch kindergarten, teachers are given freedom in the design of the material they use, and therefore have unique experience in designing curriculum material. With the ultimate aim of supporting teachers engagement in design, this study examines teachers intuitive approaches to design.

Theoretical framework

Design is about decision-making. Specifically, curriculum design is a process of deliberating, generating ideas, brainstorming and raising issues in order to resolve a problem (Walker, 1971). Design-problems are typically ill-structured, wicked, lack explicit definition of both problem and solution (Hong & Choi, 2011; Jonassen, 2000). Figuring out how to tackle the problems entails careful consideration, but also chains of decisions on how to move forward. While teachers make design decisions in their everyday practice (Ben-Peretz, 1991; Fullan, 2001), the development of decision-making skills in general and design decision-making skills in particular receives relatively little attention in most teacher preparation programs. Increasingly, researchers and experts are calling for more attention to be given to developing teachers' pedagogical design capacity (Brown, 2009).

Decision-making in design teams is predominantly based on two main factors: (a) one's existing orientations (knowledge, skills and attitudes) to factors related to the design task; and (b) ideas, arguments and orientations introduced by others (Calderhead, 1996). These ideas come together in design team interaction, which can take several forms. For example, Walker (1971) identified the following types of interactions in his classic study of design team interaction: brainstorming, issues, reports and explication. Underpinning those interactions are typically ideas, and orientations brought in by design team participants. According to Walker, the kinds of points made within design team interactions are typically pointing out problems; proposing solutions; presenting arguments; or offering instances from hearsay or experience. These stances are likely to be influenced by the (technological) pedagogical content knowledge present among design team members, and shared within a given design team.

We know from both research and experience that knowledge and logic are not the only factors that shape orientations and drive decision making. Inspired by Goodlad's perspectives of curriculum we discern three types of curricular concerns that may shape the decisions teachers make when they are designing curriculum materials:

- *Externally valued practices:* As professionals, teachers are concerned with meeting the standards set by their organization, their district, their state. Teachers have perceptions about what is valued and considered

good practice (Calderhead, 1996). While these perceptions may not dominate all the decisions teachers make, their sense of accountability does prompt many teachers to explore, if not try out the practices that are valued by their organizations and the broader educational systems to which they belong.

- *Internally valued practices*: Teachers may take the time to become acquainted with new ideas when prompted by externally valued practices, but longstanding adoption or development of new practices stems from personal conviction. That is, teachers' own beliefs about what constitutes good practice play an important role in shaping the decisions they make in classrooms and in design work (Calderhead, 1996).
- *Practical trade-offs*: For decades, it has been acknowledged that, in addition to other concerns, teachers operate according to the practicality ethic (Doyle & Ponder, 1978). Practical concerns compete with and often dominate in shaping what teachers ultimately decide to do in their classrooms. We submit that this also plays out into what teachers ultimately decide to do with their designs.

We understand that these factors contribute to teacher decision making in the classroom, and we submit that they also influence the kinds of decisions teachers make when creating curricular artifacts for use by themselves and/or others. If we are to support teachers in their process of designing, and especially if we are to shape those processes so that they are meaningful learning experiences for teachers, then we need to have a more refined understanding of what drives teacher design decision making.

About this study

The current study explored the collaborative decision making of three teams of in-service kindergarten teachers who voluntarily participated as designers of PictoPal learning material and subsequent classroom-practices (McKenney & Voogt, 2009). PictoPal is a technology-rich learning environment that uses Clicker® software together with off-computer classroom applications to help emergent readers learn the functions of written language. An essential characteristic of the software is that teachers can easily adapt or develop the software content and activities. In turn, they can also tailor the content to integrate well with ongoing classroom activities and themes, through authentic uses or dramatic play. For example, letters are composed, printed and mailed; grocery lists are compiled and 'used' to shop in a grocery store corner in the classroom; children's stories are printed and put in a book for the reading corner. For more information about teachers designing PictoPal materials, please refer to McKenney and Voogt (2012).

Three teacher design teams created content for the PictoPal learning environment (both on-computer and off-computer activities). We sought to understand teachers' intuitive approaches to design by seeing answers to three main research questions:

- RQ1: What are teachers existing orientations with regard to early literacy, pedagogy and technology?
- RQ2: What does teachers' intuitive curriculum design processes look like?
- RQ3: What kinds of reasons underpin teacher design decisions (substantive concerns, belief systems interaction and practical trade-offs)?

Methods

Data were collected before, during and after half-day design workshops (one per team). Prior to each workshop, teachers' existing general orientations toward technology, pedagogy and early-literacy were investigated through semi-structured interviews. A few weeks later, teachers were invited to a design workshop in which they collaboratively created a learning environment with PictoPal. This assignment was introduced by demonstrating the programs' functionality, and showing a video on how the program is used in practice. Any questions regarding the program were answered and the teachers were asked to design PictoPal content and activities in the form of a paper-prototype. Teachers were encouraged to discuss whatever they thought was relevant. During the design activity, teams were video recorded. At the end of the design workshop, teachers were asked to draw a concept map on early-literacy. After the workshop, teachers were interviewed again, this interview was highly structured and focused on specific orientations toward teaching early-literacy. Because they could unnaturally prompt reflection, both the concept map activity and the structured interview were intentionally deferred until after the design team work. With only the semi-structured interview taking place before the design task, minimal disturbance was introduced that could influence teachers' intuitive approaches to design.

To answer the question regarding teachers orientations (RQ1), data from the pre-workshop interview, concept map and the post-workshop interview were used. The interviews were analyzed qualitatively and the concept maps were analyzed both quantitatively and qualitatively. To answer the research question pertaining the design process (RQ2),

the transcripts of the conversation were analyzed. The analysis entailed specifying units of discourse and applying descriptive codes; this was done at two levels and based on the aforementioned work of Walker (1971). Four mutually-exclusive codes were used to describe discussion episodes (macro level): brainstorm; issue; report; or explication. At the micro level, individual utterances of one teacher at a time were analyzed using the following mutually exclusive codes: problem-statement; proposal; argument; or instance. To answer the third research question pertaining the curricular concerns (RQ3), the individual utterances were typified using two sets of codes. The first set was mutually exclusive and pertained to the curricular concerns (external, internal or practical trade-off); the second set of codes pertained to the domains of technology, kindergarten pedagogy or early literacy.

Findings

RQ1: Existing orientations

Technology

Teachers expressed having a positive attitude towards ICT in kindergarten. When asked for actual classroom practice, the examples that they showed, uncovered a proclivity towards individual children working with close-ended software. Teachers, were positive about the software that was available, and they felt that a child should be able to use it without too much help of a teacher. Furthermore, several teachers mentioned the reason for this to be practical in nature, they did not have the resources for one-on-one teacher-pupil interaction as the other children also needed their attention.

General pedagogy

The ‘socio-emotional development of kindergarteners’ was considered an essential goal by all teachers. They stressed its importance, discussing how this fosters subsequent cognitive development; helps children to understand classroom structure; and is conducive to a positive classroom climate. When asked about appropriate kindergarten classroom practice whole class-room instruction, small-group instruction and small-group play were mentioned. Whole class-room instruction, children sitting in a large circle, teacher addresses the entire group, was used during moments when a new topic was introduced, when addressing an issue or when doing language or arithmetic related games. Small group instruction was used when teachers wanted to interact more with children, for instance when one child’s language interaction with other children lagged behind, a teacher assembled a small group of children and providing close-ended instruction, allowing children more opportunity to respond individually. Finally, cooperation and peer-interaction were also valued highly. Especially the setting in which an older child helps a younger child was considered most appropriate.

Early literacy

Data from the pre- and post-workshop interview show that teachers value early literacy development very highly, claiming it to be one of the pre-requisites for active participation in today’s society. Orientations of teachers towards concepts in early literacy showed a tendency towards actual classroom activity in the area of book reading and decoding. Analysis of the interview data sources showed that most concepts were identified pertained to developing skills in the domain of (de)coding. Games with themes such as rhyming, verbal letter recognition, visual letter recognition and sound recognition were identified. Analysis of the concept map confirmed this tendency towards the (de)coding domain: of all concepts identified ($N = 149$), 81 (54,36%) were coded as (de)coding; 26 (17,45%) on functional literacy; 25 (16,78%) on reading and 17 (11,40%) were coded as other. Furthermore the analysis of the conceptual understanding revealed that most concepts that were identified, directly pertained to early literacy teaching-practice, showing a strong connection with and influence of pedagogical knowledge. It also showed that the conceptual understanding was explained through classroom-examples. As an example, one teacher mentioned: “We do such things as rhyming games, or letter games.” Another teacher mentioned that she addressed early literacy throughout the entire day and that this occurred mostly unplanned: “It is not like I think, well let’s do rhyming now. That’s not how it is done.”

RQ2: Intuitive approaches to design

The macro level analysis shown in Table 1 gives the distribution of types of episodes across the three groups, as well as the number of lines that were coded as deliberative move. The macro-level analysis revealed that from a total of 26 episodes that were found in the transcripts of the discourse, 13 (50%) were coded as brainstorms as compared to

10 issues (38,46%). It is notable that brainstorm episodes have a higher ratio of moves per episode: 30,61 than issues: 16,7.

Table 1

Distribution of episodes and number of utterances coded in each (between brackets) across three design groups.

	<i>Brainstorm</i>	<i>Issue</i>	<i>Report</i>	<i>Explication</i>	<i>Total</i>
Group 1	6 (146)	4 (63)	1 (1)	0	11 (210)
Group 2	3 (125)	3 (32)	1 (1)	0	7 (158)
Group 3	4 (127)	3 (72)	0	1 (15)	8 (214)
Total	13 (398)	10 (167)	2 (2)	1 (15)	26 (582)

The micro-level analysis (Table 2) revealed that from a total of 1216 utterances, only 582 were coded as a deliberative move. Of those utterances, 400 were coded as proposal (68,73%); 103 as argument (17,50%); 41 as problem (7,05%); and 38 as instance (6,53%). Of all utterances that were coded as proposal, most of these pertained to episodes of brainstorm. Group 1: 114 out of 146 (78,08%); Group 2: 111 out of 125 (88,89%) and Group 3: 97 out of 127 (76,38%), in total 322 of 398 (80,90%). Furthermore when looking at the total number of problem statements, in group 1, 11 were made in brainstorm episodes, and 11 were made in issue episodes. In group 2, 1 was made in a brainstorm episode, 8 were made in issue episodes. In group 3, 6 were made in a brainstorm episode, 3 were made in an issue episode and 1 was made during an explication. In total 41 problem statements were found in the discourse.

Table 2

Distribution of deliberative moves across three design groups.

	<i>Argument</i>	<i>Problem</i>	<i>Instance</i>	<i>Proposal</i>
Group 1	26	22	10	152
Group 2	19	9	13	117
Group 3	58	10	15	131
Total	103	41	38	400

RQ3: Design reasoning

The coding of the design reasoning (Table 3) revealed that from the total of 582 lines, 499 (85,74%) were coded as practical trade-off; 40 as internal (6,87%) and 43 (7,39%) as external. Table 4 shows the distribution of frequencies for each of the domain codes that were also coded as practical trade-off, percentages of domain codes were calculated from total lines that were coded as practical trade-off. The table reveals that most of the utterances, that were coded as pertaining to practical trade-off were coded with TPC. Qualitative investigation of the utterances furthermore revealed, that the types of utterances that were coded T, TP or TPC all related to design of: specific content of the program or how the program was used in classroom.

Table 3

Distribution of curricular concerns across various domains of teachers knowledge.

	<i>C</i>	<i>P</i>	<i>PC</i>	<i>T</i>	<i>TP</i>	<i>TPC</i>	<i>Total</i>
<i>External</i>	5		28			10	43
<i>Internal</i>	1	2	27		1	9	40
<i>Practical</i>	2	4	100	100	53	240	499
Total	8	6	155	100	54	259	582

Note: early literacy was coded as C; pedagogy was coded as P; teaching early literacy was coded as PC; technology was coded as T; teaching/learning with technology was coded as TP; and teaching/learning early literacy was coded as TPC.

Table 4

Distribution of utterances coded as Practical concerns.

<i>C</i>	<i>P</i>	<i>PC</i>	<i>T</i>	<i>TP</i>	<i>TPC</i>
2 (0,4%)	4 (0,8%)	100 (20%)	100 (20%)	53 (10,62%)	240 (48,09%)

Conclusions

The results on the first research question already revealed a certain preference in the existing orientations towards addressing specific classroom issues when discussing their orientations towards technology, pedagogy and early literacy. This would lead to the conclusion that their orientations are mainly influenced by their existing knowledge and beliefs in regard to teaching/learning in kindergarten education. Subject matter, or early literacy concepts, are not as deeply rooted as concepts in kindergarten education. Therefore it is expected that decision making is mostly influenced by pedagogical orientations: how a child learns in kindergarten and how this learning is supported by a teachers. Furthermore, the results of the interviews revealed that teachers expressed their orientations providing examples of actual classroom practice. This would confirm that teachers knowledge is practical in nature, rooted in classroom practice and school context with a large number of exemplary appropriate practices.

The second research question focused on the design process in terms of what kinds of conversational routines are used by teachers when discussing the contents and instructional strategies of the PictoPal learning environment. Results of the discourse analysis show that episodes of brainstorm occurred mostly and contained most of the utterances. This would suggest that the design-process of teachers can best be described as a lengthy brainstorm in which various proposals are made. These proposals often are not met with argumentations against during these episodes of brainstorm. This would suggest that mainly, that teachers do not hold lengthy discussions, rather they come up with various ideas. When no disagreement is found, other participants do not disagree, then the decision is taken: the proposal is enacted as part of the learning material. The number of such proposals within episodes of brainstorm greatly exceeds all other types of deliberative moves. Most decisions therefore are not taken out of resolving a problem, but by coming up with the most viable solutions.

The third research question focused on the concerns that teachers raised during deliberation, and whether these concerns stem from externally identified good practice, internal good practice or practical trade-offs. The results of this study showed that most concerns were practical in nature, pertaining to perceived problems in classroom, arguments that were grounded in insights from kindergarten practice. The number of utterances that were coded as practical trade-off greatly exceeds the number of all other types of concerns (85,74%). This suggests that these three groups concerns were mainly on what is practical, feasible and not what is most appropriate. In light of their existing orientations, these results are expected.

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