Subject knowledge in early childhood education:
Risks and possibilities
Helen Hedges

Abstract
The concept of ‘subjects’ has posed a philosophical dilemma for early childhood education. This paper reports on a study that explored beliefs and practices in one kindergarten in Auckland about subject knowledge. The study’s findings are analysed from the perspective of teacher knowledge and sociocultural theory. The paper argues that a sociocultural view of knowledge has potential within the existing philosophy underpinning early childhood curriculum and pedagogy to recognise subject knowledge. Implications for curriculum, pedagogy, teacher education and professional development are described.

Introduction
Early childhood curricula documents internationally commonly neglect or underemphasise subject content knowledge (MacNaughton, 1999). Accordingly, the curriculum document for early childhood in Aotearoa/New Zealand, *Te Whāriki* (Ministry of Education, 1996), does not emphasise subjects. *Te Whāriki* has a broad definition of curriculum. Coupled with an integrated, holistic approach, this leaves teachers unclear about what kind of conceptual knowledge is appropriate for young children, how to teach it, and what knowledge teachers need themselves to support children’s learning. Consequently perhaps, little attention has been paid to teachers’ and children’s subject knowledge and the role these might play in curriculum and pedagogy to extend and enhance young children’s learning. This paper reports on a study (Hedges, 2002a) underpinned by sociocultural theory, that investigated beliefs and practices of teachers, parents and four-year-old children about subject knowledge in one setting. The study’s findings raise for discussion the risks and possibilities posed by emphasising subject knowledge in early childhood education.
Literature review

Teachers’ beliefs impact on the curriculum and pedagogy offered to children and mediate between teachers’ knowledge and performance (Pajares, 1992). Parents’ beliefs are formed from a mix of personal and cultural experiences, including their own experiences of education. Several studies report that parents can be a source of pressure for teachers to deliver a structured subject-focused curriculum (Cherrington, 2001; McLeod, 2002). A sociocultural view of children as capable and competent suggests children’s beliefs might impact on the curriculum and pedagogy they experience also.

The early years field appears polarised on beliefs about subject knowledge. Some writers argue that a subject-based approach to curriculum is contrary to the ways children think and learn and invites inappropriate formal “push-down” pedagogical approaches (Corrie, 1999). Yet, subject-based outcomes are seen as desirable (Marcon, 2002; Wylie, Thompson & Lythe, 2001). Conversely, others argue that subject knowledge is essential to support children’s learning (Cullen, 1999). Of relevance, research about the extent and depth of children’s prior knowledge (e.g., Aubrey, 1997; Toyama, Lee & Muto, 1997) suggests that teachers might need broad subject knowledge in order to extend children’s learning. In addition, research suggests that teachers who are confident about their subject knowledge are more likely to recognise and maximise potential learning in children’s play experiences (Anning & Edwards, 1999).

The research problem investigated in the present study was generated from the concerns and contradictions that appeared in the literature reviewed. Teacher beliefs were established as an influential construct. Claims made in the early childhood literature that subject knowledge is not important appeared based on philosophical ideals and a concern that attention to subjects might lead to inappropriate pedagogy. Therefore, research that provided insight into the beliefs held by teachers, parents and children about subject knowledge, and how these influenced early childhood curriculum and pedagogy became the focus of the present study.
Methodology

The study involved an investigation of beliefs and practices within a context, linked to an excursion to Kelly Tarlton’s Antarctic Encounter and Underwater World, in Auckland. An interpretivist case study methodology was adopted in the research design and data gathering procedures as this focuses on understanding how people make sense of their experiences within a framework of socially-constructed, negotiated and shared meanings that include beliefs (Hughes, 2001; Stake, 1996).

The participants were teachers, parents and four-year-old children from a half-day sessional kindergarten. Ethical principles of voluntary participation, informed consent and minimising harm were considered, particularly in relation to children’s participation (Hedges, 2002b). Focus group interviews (Morgan, 1997) were used as the primary data gathering technique. The three teachers, eight parents accompanying the excursion, and nine children, were interviewed in three separate participant groups the week before and the week after the excursion. Several other data gathering techniques were used to assist and validate interpretation of focus group interview findings: parent and teacher diaries, documentary evidence of curriculum planning and evaluation meetings, and fieldnotes of participant-observation over the seven weeks spent in the setting.

Qualitative analytic methods were used to analyse the data. The transcripts and other evidence were studied carefully, looking for emerging themes and categories. Participants expressed clear beliefs about subject content knowledge. However, the beliefs were more complex than discussion of just subject content per se. Beliefs about subject content were also embedded in discussions about knowledge, pedagogy, curriculum, children and the kindergarten context. Data were therefore coded according to repeated ideas and topics. Two conceptual frameworks were then utilised to discuss the findings: models of teacher knowledge and sociocultural theory. Data analysis and presentation of findings draws across all data sources.
### Results

#### Categories of teacher knowledge

Various models of teachers’ professional knowledge exist that include subject knowledge as crucial to successful teaching and learning (Grossman, 1990; Shulman, 1986; Wilson, Shulman & Richert, 1987). These models were examined for relevance to the data. To explore the beliefs, the following themes were effective in explaining the findings: subject content knowledge, knowledge of pedagogy and philosophy, knowledge of learners and knowledge of context. Data were therefore analysed in relation to these four constructs as a conceptual framework of teachers’ professional knowledge. Curriculum is viewed as an overarching and all-encompassing construct in which the four themes are embedded. This is consistent with Bruner’s (1960) view of curriculum as incorporating subject knowledge, knowledge of learners and the process of gaining knowledge.

The following tables summarise the results:

Table 1: Summary of beliefs and practices within categories of teacher knowledge

**Subject content knowledge** – factual and conceptual knowledge; specialised knowledge

<table>
<thead>
<tr>
<th>Beliefs</th>
<th>Practices</th>
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<tbody>
<tr>
<td>Teachers and parents believed that accessing specialist subject knowledge to support planned learning experiences, such as the excursion and small group teaching episodes, was important.</td>
<td>Teachers used specialist knowledge in planned teaching interactions with children e.g., classification of species of sharks.</td>
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<tr>
<td>Children believed teachers should be knowledgeable about the excursion. Children revealed a range of specialist knowledge and interests.</td>
<td>Teachers recognised the importance of accessing specialist knowledge for purposeful teaching.</td>
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<td>Children expected teachers and parents to have content knowledge to answer their questions and support inquiry.</td>
<td>Subject knowledge was underemphasised in spontaneous teaching interactions. Children’s cues and inquiries were often overlooked.</td>
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<td></td>
<td>Planning, assessment and evaluation based on <em>Te Whāriki</em> did not reflect an emphasis on subject content knowledge.</td>
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Knowledge of pedagogy and philosophy – effective learning and teaching processes consistent with early childhood philosophy.

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<tr>
<th>Beliefs</th>
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<tr>
<td>Teachers believed that play-based opportunities based on children’s interests provided teaching opportunities. Teachers described informal teaching styles.</td>
<td>Subject knowledge was used in planned teaching situations, but underemphasised in spontaneous teaching interactions.</td>
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<tr>
<td>Some parents understood that play was important as a pedagogical approach. Other parents viewed teaching and learning as more structured than their perception of kindergarten experiences.</td>
<td>Teachers’ interactions reflected an emphasis promoting skills such as thinking, reasoning and problem-solving rather than knowledge construction.</td>
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<tr>
<td>Children believed teachers, parents and children were sources of knowledge and teaching.</td>
<td>Small group teaching sessions were being trialled and evaluated.</td>
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<td></td>
<td>Parents’ interactions reflected an emphasis on content learning and beliefs about the importance of literacy.</td>
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Knowledge of learners – individual interests, capabilities and learning preferences

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<tr>
<th>Beliefs</th>
<th>Practices</th>
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<tbody>
<tr>
<td>Teachers believed that knowing children’s interests is important in building relationships and planning curriculum to extend their knowledge and interests further.</td>
<td>Planning, assessment and teaching interactions were based on children’s interests. Portfolios included accounts of children’s interests and knowledge.</td>
</tr>
<tr>
<td>Parents believed that teachers’ knowledge of children as individuals, and children’s interests and learning styles was important in extending their knowledge and interests further. They were enthusiastic about their children’s individual assessment portfolios.</td>
<td>The excursion was planned to build on the knowledge and interests of focus children.</td>
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<tr>
<td>Children believed that teachers need to know the children they teach. Children were aware of the significance of portfolios as a record of their learning.</td>
<td>Portfolios were used as a communication tool with parents. Parents were involved in planning and evaluation.</td>
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</table>
**Knowledge of context** – setting, organisational systems and culture, knowledge of families and community

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<tr>
<th>Beliefs</th>
<th>Practices</th>
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<tr>
<td><strong>Group size</strong></td>
<td><strong>Small group teaching at the beginning of each session</strong> was introduced as an opportunity for more focused and sustained learning. Sometimes this utilises teachers’ subject knowledge. These sessions were planned and evaluated informally and not documented.</td>
</tr>
</tbody>
</table>
| • Teachers believed that group size was a constraint on opportunities to construct knowledge with children and extend their learning. | |}
| • Parents believed that group size was a constraint on both teachers’ work with children and their own opportunities to interact with their own children when they assisted at kindergarten. | |}
| • Children did not feel restricted by teachers or the environment. | |}

**Kindergarten/junior primary**

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<tr>
<th>Beliefs</th>
<th>Practices</th>
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<tr>
<td>• Teachers and parents believed that both the curriculum and the pedagogical approaches of primary school contrasted to that of kindergarten. They felt this was difficult for children as they transitioned between the environments.</td>
<td><strong>Small group teaching at the beginning of each session</strong> has been introduced as a more focused teaching approach.</td>
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<tr>
<td>• Children believed that primary school would be more formal than kindergarten. The status of “being nearly five” was a strong learning orientation for preparing to transition between contexts.</td>
<td><strong>School “preparation”</strong> such as early literacy occurred within the normal context of learning experiences, but was not always documented.</td>
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The beliefs of the teachers, parents and children, and the interests and inquiries of the children support the view that subject knowledge was important. Subject knowledge was present in interactions related to the excursion and on a few other occasions. However, subject knowledge was underemphasised in the majority of spontaneous interactions that constituted most of the time children spent with teachers during the kindergarten session, for example, a child discussing the mechanics of car engines and
design with a teacher; children discussing astronomy, rocketry and space travel with a
teacher; and a child asking why white glue dried colourless. Moreover, the subject
content element of children’s learning was rarely included in documentation used to
support and justify curriculum and teaching practice to parents and agencies such as
the Education Review Office.

Consideration of links between beliefs and practices revealed congruence in planned
teaching interactions, but not in relation to spontaneous teaching interactions.
Discrepancies that occurred were related to the use of Te Whāriki as the tool for
curriculum planning and evaluation, teachers’ emphasis on cognitive skills rather than
knowledge construction in spontaneous teaching interactions (also related to the
emphases of Te Whāriki) and the constraints of group size. It was also suggested that
the research itself is likely to have had a positive impact on the beliefs-practice
congruence with respect to subject knowledge related to the excursion.

Nevertheless, the data provided strong support for the view that subject knowledge
can add depth and substance to children’s learning. Subject knowledge perhaps
requires the more explicit acknowledgement of its significance in early childhood
education, as is accorded it in other education sectors. Moreover, it is possible that Te
Whāriki’s underemphasis on content contributes to teachers’ lack of awareness of its
importance to children in their knowledge construction.

A sociocultural analysis

The data obtained were subsequently reflected on further in relation to sociocultural
theory to investigate how a sociocultural perspective might enrich and extend the
perspective of subject content knowledge and learning in early childhood curriculum
and pedagogy.
A sociocultural perspective of learning (see Dahlberg, Moss & Pence, 1999) promotes that:

- social interactions with more knowledgeable others extend children’s capabilities, hence the term “socially-constructed learning”
- learning is socially and culturally situated and mediated.
- knowledge is shared across a culture rather than belonging to individuals
- learning is concerned with meaning-making and inquiry processes, through active participation in learning experiences that enable learners to participate increasingly effectively in their cultural communities
- the construction of knowledge is an outcome of these actions

Sociocultural educational practice emphasises teaching as an active, complex and contextualised process. Further development of sociocultural perspectives have led to discussion of the role of cultural tools in learning and new pedagogical approaches.

Sociocultural approaches to curriculum and pedagogy in early childhood education, taking prior knowledge into account and emanating from children’s interests and inquiries, emphasise the importance of intersubjective pedagogical relationships within the learning contexts in which children engage. To support a sociocultural analysis of subject content knowledge opportunities, concepts of pedagogical relationships in learning communities that highlight active, collaborative engagement were applied (Rogoff, Matusov & White, 1996; Wells, 2001; Wenger, 1998). These enriched explanation of the study’s findings with regard to subject knowledge in curriculum and pedagogy. Four significant pedagogical relationships were evident: teachers and children, parents and children, child peers and children and the researcher (see Hedges, 2002a for details). This analysis provided evidence of the socially-constructed nature of children’s subject content learning within one
kindergarten community and lends credence to the sociocultural notion of learning communities.
Discussion

Possibilities

Curriculum and pedagogy

In the present study, there was coherence between beliefs and practices with regard to subject knowledge related to the excursion. However, evidence suggested that the research itself contributed to this level of coherence. Conversely, many of children’s subject-knowledge related inquiries appeared unnoticed in the wider curriculum within spontaneous interactions between teachers and children. In a play-based, child-initiated curriculum, dialogue that may promote knowledge construction occurs mainly within such spontaneous interactions that arise from and respond to children’s interests and inquiries. Subject content knowledge can be increased if sustained interaction occurs alongside a knowledgeable adult or peer.

Teacher awareness and confidence in subject knowledge is also necessary. Beyond confidence, teachers may also need to demonstrate a certain level of subject knowledge. Recent studies have revealed teacher’s subject knowledge as inaccurate (Kallery & Psillos, 2001) and/or inadequate (Siraj-Blatchford, Sylva, Muttock, Gilden & Bell, 2002). To extend children’s learning, teachers need to lead children towards accurate conceptual understandings.

The study’s findings suggest that a curriculum’s lack of emphasis on subject content knowledge may limit learning and teaching opportunities and children’s inquiry-based learning. Although not designed to prescribe subject content, the principle of holism espoused in Te Whāriki may not be incompatible with an increased focus on subject knowledge. An emphasis on subject learning can also be viewed as in keeping with the current focus in Aotearoa/New Zealand on dispositions for learning (Carr, 2001a). In this study, “being a scientist”, “being a technologist” and “being nearly five” were examples of Carr’s (2001b) concepts of learning orientations for children that incorporated significant subject learning.
Teacher education and professional development

The study highlights that providing some subject knowledge is an important current issue for initial teacher education. One teacher, Mary, noted that she had undertaken subject learning during teacher education, but felt it was piecemeal, insufficient and left her feeling unprepared. Teachers need adequate knowledge from a wide range of subjects (Haynes, 2000; Kallery & Psillos, 2001; Willer, 1994) and an understanding of pedagogical strategies to work with young children’s knowledge alongside confidence in their own subject content knowledge (Cullen, 1999).

Supporting calls for greater emphasis on subject knowledge, is that where teachers’ subject knowledge is deeper, teachers are more likely to be confident about integrating curriculum, be aware of their own subject knowledge gaps, and be more open to children’s interests, ideas, contributions, and questions (Anning & Edwards, 1999; Grossman, 1990). Limited teacher confidence about subject knowledge could also be attended to through professional development. Studies of professional development in the early childhood sector (Kirova & Bhargava, 2002; Watters, Diezmann, Grieshaber & Davis, 2001) support the argument that teachers’ subject knowledge enables appropriate curriculum planning to occur, guides pedagogical approaches and documentation that facilitate meaningful learning for children and assists teachers’ confidence and professional growth.

Risks

Misinterpretation of a “knowledge economy”

Recent calls in New Zealand to develop a “knowledge economy” could be misinterpreted in the early childhood sector (May, 2001). Calls for early academic learning to give economic advantage and calls for an outcomes-based model of learning and assessment are all risks of adopting an overt approach to subjects. Yet, Marcon’s (1999, 2002) research findings suggest that while an initial advantage may exist, there are no long-term gains for children from formal approaches. Some research has demonstrated the opposite: that later achievement is lower for children
taught didactically than for children who have learned in a play based, child-initiated environment (David et. al., 2000; Marcon, 2002). The danger exists that studies such as this one will be interpreted and cited without the caveat that the content knowledge is constructed in an integrated, play-based environment that provides authentic experiences appropriate for young children.

There are risks associated with the current employment of practitioners who lack the professional knowledge and qualifications to articulate a sociocultural perspective, respond appropriately to societal expectations and avoid the pressure of a narrow view of a “knowledge economy”. Specifically, there is a danger in responding to parental pressure to give children a “headstart” in a consumer-driven market model of early childhood education. For example, there is curriculum content based on rote learning of letters and numbers in many centres. These experiences may not be authentic and meaningful to children in the context of their current interests and experiences. This is again a particularly pertinent consideration in a field still characterised by under-qualified practitioners.

**Emphasising literacy and numeracy**

Literacy and numeracy are currently central initiatives in education. The Education Review Office (2000) noted that a potential effect of emphasising knowledge such as literacy and numeracy is a consequent focus on formal academic learning that is inappropriate in early childhood education. The polarised philosophical positions of the “child-initiated play” versus “academics” can be resolved by a sociocultural perspective of co-constructing culturally-valued knowledge in authentic, meaningful contexts. For example, the present study indicates that literacy and numeracy occur within the educational context, but that teachers’ professional knowledge is crucial to realising opportunities to promote and emphasise these in teaching interactions and documentation (Hedges, 2003).
Conclusion

Young children benefit from teaching embedded in experiences that are meaningful to them such as play. Children had a wide range of interests and knowledge in this study and expected that teachers and parents would have knowledge to support and extend these interests. Subject content knowledge is a vital component of early childhood teachers’ knowledge if children’s conceptual learning is to be extended in response to their thirst for knowledge. The subject knowledge possibilities for enhancing children’s learning recommended by this paper are designed to enhance the play-based, integrated philosophy of early childhood education and to enable confident, knowledgeable teachers to respond meaningfully to children’s inquiries. This requires a deep level of professional knowledge and understanding about content. The teachers in this study noted both the invisibility of their pedagogy and a professional responsibility to articulate this with parents. This articulation may also be wise practised with organisations that early childhood services are accountable to.

A sociocultural perspective provides justification for strengthening the place of subject content knowledge in early childhood curriculum and pedagogy. Firstly, it provides an acknowledgement of the way that the content of learning may be negotiated within cultures and communities to reflect knowledge that is culturally-valued and allow for multiple views and perspectives. Secondly, it suggests that philosophical debate in early childhood that has led to polarised views about the position of subject knowledge might be less acute if rethought from a sociocultural perspective. The sociocultural view of children as capable and competent, the central mediating role of dialogue, and the intersubjective nature of the reciprocal and responsive relationships highlighted in early childhood pedagogy, support an argument that purposeful teaching and learning occurs when teachers’ subject knowledge contributes to appropriate pedagogical strategies and meaningful learning experiences for children. Possibilities for co-constructing and extending children’s knowledge and interests are then immense.
Reference list


**Acknowledgements**

♦ Heartfelt thanks to the teachers, parents and children of Oaktree Kindergarten, Northern Auckland Kindergarten Association, July-September 2001, who participated in the study.

♦ Sincere thanks to my supervisors, Professor Joy Cullen and Jenny Boyack, Massey University College of Education.

♦ The Massey University Human Ethics Committee reviewed and approved this project - PN Protocol 01/38. On March 5, 2002 permission to credit the kindergarten by naming it was received.

♦ The Graduate Research Fund and the Department of Learning and Teaching of Massey University College of Education each contributed funds towards the cost of the research.