

Changing teacher-student relationships through ICT: Student mentors in Australia

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This doctoral study focused on the development of a relationship between teachers and their students, in a context where nine- and ten-year old students mentored teachers in the development of their knowledge, skills and confidence in the use of digital cameras and related software in their classrooms. Throughout the process, growing confidence was observed in both teachers and child mentors, and a relationship, highly valued by both, developed. Teacher learning gains were evident early in the study. Of particular note were the unexpected gains related to teacher insights regarding enhanced children's confidence, and the possibilities this created for the whole school learning community.

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Purposes

Technology continues to have an influence in Australian schools, but many teachers are still not comfortable with its use in their classrooms (Pina & Harris, 1993; Smith, 2000; Tenore, 2000). This study explored the possibility of teachers becoming more confident and skilful with ICT in their classrooms by relying on the knowledge and skills of children to mentor them in their learning of ICT. The process aimed to take the pressure off the ICT 'experts' in schools to allow them to focus on mentoring a group of students, who in turn took on the role of mentoring the school staff. The implementation of this mentoring model was studied in two different settings to determine the benefits and impediments to its success, and the effect it had on the knowledge, skills and confidence of the teachers involved, and subsequent impacts on classroom practice.

Theoretical Framework

Different scholars have offered frameworks for viewing professional learning. Relevant to this study are those who relate to mentoring and/or technology. Loucks-Horsley, Stiles and Hewson (1996) developed relevant strategies for professional learning focussing on coaching and mentoring (Fig. 1).

Their model of Workshops, Institutes, Courses and Seminars highlighted the fact that there must be opportunity for the learners to shape the sessions, time for reflection, prediction and exploration, and a safe environment for experimentation. Teachers need to know that the professional learning in which they are participating impacts on their teaching, and, like children, they want to explore and experiment.

Coaching and Mentoring	
usually occurring	<ul style="list-style-type: none"> • both in & out of class
opportunities	<ul style="list-style-type: none"> • formal & structured
facilitators or leaders	<ul style="list-style-type: none"> • one- on-one • knowledge & skills of more experienced adult
time periods	<ul style="list-style-type: none"> • vary but ongoing
Learning goals addressed	<ul style="list-style-type: none"> • provide confidence and ability to improve practice
key elements	<ul style="list-style-type: none"> • focus on learning or improvement • opportunities for interaction • mechanisms for sharing & feedback
implementation requirements	<ul style="list-style-type: none"> • climate of trust, collegiality, continuous growth • administrative support • long term commitment to interaction • skill building in coaching & mentoring
must contain	<ul style="list-style-type: none"> • trust & sharing relationships to overcome norms of isolation & privacy • approaches vary. choose one that suits. • time to meet etc

Figure 1. Relevant strategies for professional learning (adapted from Loucks-Horsley et al, 1996.)

The Loucks-Horsley et. al. model was not specifically for technology so further models were explored. Rodriguez & Knuth, (2000) created a model of effective professional development specifically for technology. The components that they identified as essential to effective professional development for technology in schools, as outlined in Figure 2, are relevant to any model for professional development for technology in schools.

Connection to Student Learning	Ongoing Process
Hands-On Technology Use	Sufficient Time
Variety of Learning Experiences.	Technical Assistance and Support
Curriculum-Specific Applications	Administrative Support
New Roles for Teachers	Adequate Resources
Collegial Learning	Continuous Funding
Active Participation of Teachers	Built-In Evaluation

Figure 2. Components of effective professional development for technology use (Rodriguez & Knuth, 2000).

The model used in this study is primarily an adaptation of Rodriguez & Knuth and Loucks-Horsley et. al, with two major influences. Firstly, the facilitator in this mentoring was not a more experienced adult, but a child who has more relevant experience with ICT than the adult. Secondly, the relationship between the mentor and the mentee is a major focus. Neither of these were a focus of the research explored in the literature, so an adapted model has been created to include these two items seen as crucial to the present study.

The model developed for teacher professional development using children as mentors is shown in Figure 3. This shows the teacher at the centre, and ICT and child mentors alongside the teacher, emphasising the importance of the relationship. The relationship symbol has sixteen key items surrounding it. These

items are broken visually into two groups with all informing the process of mentoring between the student mentor and the teacher as mentee. The green octagonal shapes are focused on the teacher, so are closest to the centre. The arrows show items that influence the teacher. Some of these involve the relationship with the children, while others are items that will show themselves through the course of the mentoring, but would not be directly observable during the sessions. This model structured the form of the program in the schools, and was part of what guided data collection and analysis.

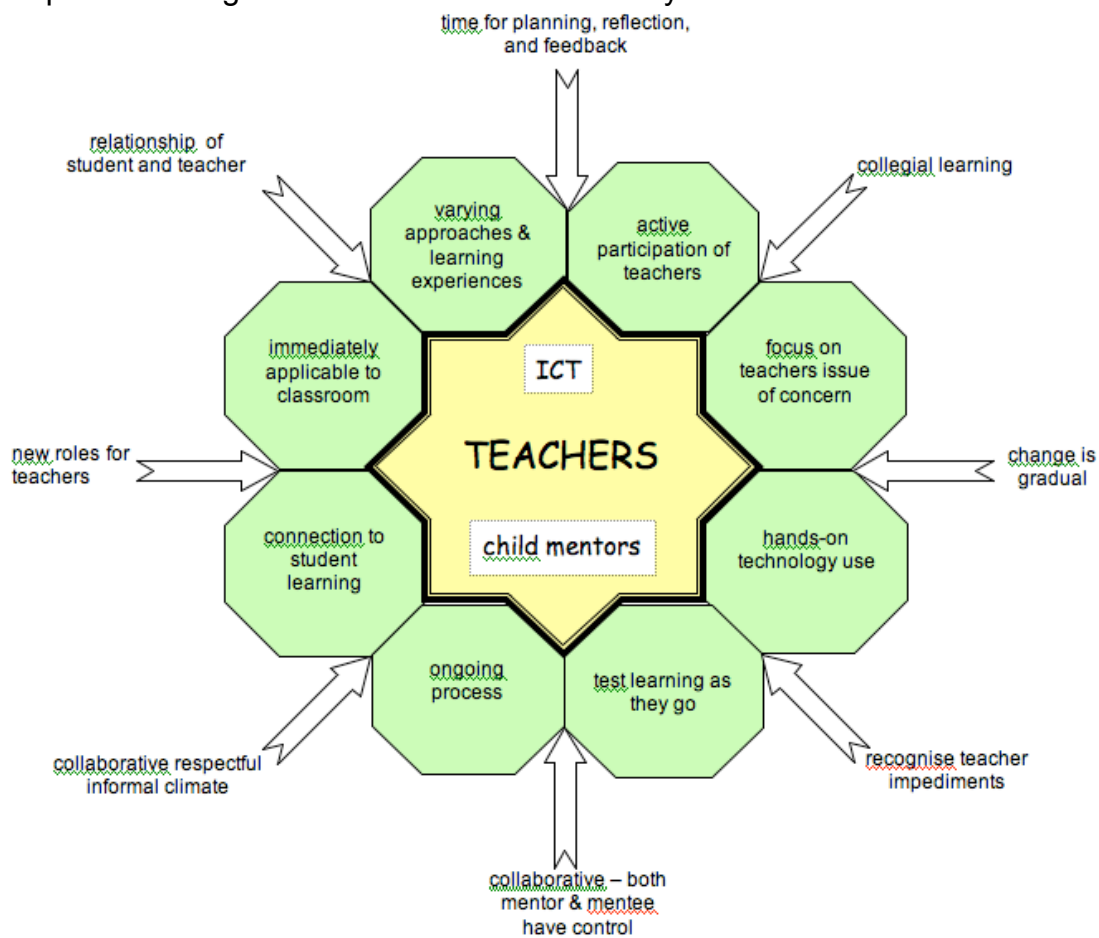


Figure 3. Model of professional learning for child to teacher mentoring.

Research Methods

Design of the study

The study focused on an innovative model of teacher professional development in ICT. The research was based on a pilot study, which showed the effectiveness of a different relationship between teachers and students in their teaching and learning of ICT. The study proposed a model where students in one class become proficient with a new piece of software or peripheral and they in turn act as mentors for the teachers in their school to develop their proficiency with the software.

Initially the children were exposed to the use of digital cameras and editing components of software by a school staff member and/or the researcher. Under their supervision, children explored the cameras and software until they had a working knowledge of the majority of facets of the cameras and software and some of their uses in education. This training was undertaken formally once a week over a term, but many informal sessions also occurred throughout normal classroom interaction. Intertwined with this camera and software exposure was focused discussion on what it means to be a mentor.

Data sources

Data were gathered from two schools in which a grade 3/4 class provided the mentors. In one school, the researcher prepared the children for their role. In the other, a classroom teacher provided the input, with support and assistance from the researcher.

All teachers and students completed pre- and post-questionnaires, including items relating to background details and attitudes, including data encompassing teacher and student perception of their attitudes, knowledge and skills.

Data were collected through questionnaires using a 0 to 10 Likert scale, observation and interview. Interactions within the mentoring teams in three formal 20 to 30 minute mentoring sessions were observed and digitally recorded, supported by field notes. In addition to these sessions, teachers were encouraged to seek out their mentor/s when they had an issue with this specific camera or software, but also with technology in general. Teachers and children were encouraged to complete journals reflecting on their participation.

To gain data on the student's perceptions of the effect of the approach on the teachers, and also on their personal reflections on their experiences during the mentoring sessions, students were interviewed as a group between mentoring sessions and individually at the end of the series of three mentoring sessions.

Other main stakeholders in the school, such as the principal and project coordinator, were also interviewed. Anecdotal comments from parents were provided by principals, teachers and students.

Methods of analysis

The "three concurrent flows of activity: data reduction, data display and conclusion drawing/verification" (Miles & Huberman, 1994, p. 10), were used. Expert colleagues reviewed the coding and coded themes to validate the grouping and themes arising. Quantitative data were analysed using SPSS.

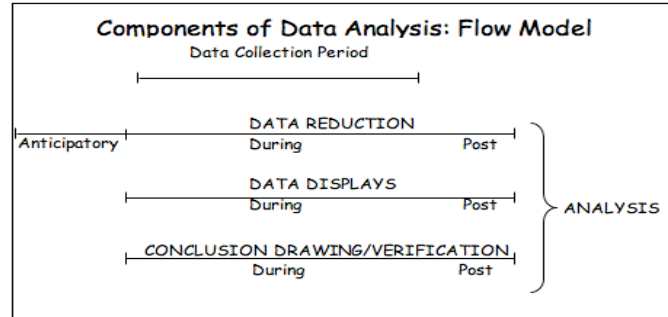


Figure 4. Data analysis components: Flow model. Miles and Huberman (1994, p.10).

Initial analysis of the qualitative data began with the sorting into coded themes using the developed mentoring model (Fig. 3) as a focus. The computer software *Nvivo* (Nvivo, 2005) assisted in this process. The use of the mentoring model for analysis became problematic, as it was the professional development model; it was not showing the depth of the data that developed through the mentoring sessions. To show this the observation schedule that was more specific than the overall professional development model was utilised. The headings for each category are listed in Figure 5. These categories provided a more helpful framework for data analysis.

Mentor (C=Child)	Mentee (T=Teacher)	Relationship between mentor & mentee
C1. Characteristics	T1. self as a learner	R1. Good rapport between mentor and mentee
C2. Learning Environment [manner of interaction]	T2. relationships	R2. Trust and confidentiality
C3. Approach [How they teach]	T3. approach to project	R3. Clear objectives and goals
C4. Interaction—explanations [How they tell - content model]	T4. reactions with mentor	R4. Mutual respect
C5. Interaction—discourse [How they encourage learning-foster interaction]	T5. take control of learning	R5. Clear communication and feedback
C6. Planning	T6. persistence	R6. Physical environment comfortable
C7. Management	T7. making choices	R7. Shared experience
C8. Relationships between mentors	T8. approach [doing]	R8. Acknowledgment and celebration of achievements
		R9. Others are aware and supportive
		R10. Locus of Control

Figure 5. Observation Schedule Headings

Preliminary Results

Data analysis is still progressing but it is already clear that the teachers involved highly valued the assistance of student mentors in the development of their confidence, knowledge and skills with ICT and that effects on their classrooms have already been seen in the following areas: Teacher confidence when others are using ICT; Teacher use of cameras in class; Teacher confidence to try other forms of ICT; Teacher use of mentors within their own class and the school; The appropriateness of children teaching; Teacher view of the children and their capabilities; Teacher narrow vision of capable and not so capable children; Improvement in teacher/student relationships.

Improvement in teacher confidence, skills and knowledge

The improvement in teacher confidence is evident in both the quantitative and qualitative data, particularly for those teachers who rated themselves low on the scale to begin with. Teachers showed an increase of an average of 1.8 points on a Likert scale from 0 to 10, with one teacher showing a move from two to eight. Even more substantial were changes revealed by the qualitative data. Prior to the mentoring sessions, I observed and had incidental conversations with teachers regarding their confidence with technology, and although they had all used various ICT in their classrooms, many staff showed and talked of, anxiety with the continual expansion of ICT and their need to keep up with the children in their classes.

Teacher confidence has been evident in three main areas: Teacher confidence when others are using ICT; teacher use of cameras in class; and teacher confidence to try other forms of ICT.

Teacher confidence when others are using ICT

One teacher rated her confidence at 4 on a 0-10 scale before the mentoring sessions began and 6 after the series of three mentoring sessions. Her confidence was shown, not in her actually using the technology, but in the fact that she felt happier when others were using it, as she understood what they were doing and felt she was capable of doing it herself.

I have gained some knowledge and some skills. We've [staff] been working with some photos for a special event that is happening at the end of the year and just incidentally we played with some yesterday and I thought, "Oh, this is good, I know what the computer is capable of doing". I wasn't actually doing it, I was watching someone but I was also building on what I'd learnt and I thought, "No, I can do that". So you know I felt confident that I've learnt some skills that will be useful and they are. (Rebecca, interview, 06/12/2006)

Teacher use of cameras in class

With confidence on the use of cameras raising an average of 3.1 on a scale from 0 to 10, and three teachers changing their rating by 5 or more points, there were many comments on the use and potential use of cameras in the classroom. For some the ideas are just starting to arise. "Well, I think I will make more use of the camera. We started up a little garden and the two girls have been taking photos and I think I will use the camera all the time, [for] language activities etc" (Heather, interview, 06/09/2006). Some had started simple uses of the camera with children, as Rita explained:

I just know enough to use it adequately in a simple situation, I can't do the wonderful things I know that you're able to do with it and that is something I would love to do, but I haven't done it yet ... We did a beautiful Values PowerPoint and played some music and played the shots and that was something I wouldn't have done before the [mentoring] with the girls. (Interview, 20/10/2006)

For others, the actual use of the camera is becoming commonplace and they are actually assisting their students to use the technology. Josie was very excited to actually assist the students and for her that confirmed her improvement.

I have gained confidence in using the technology. I have gained knowledge, well knowledge how to use it and then that's the confidence. I think it has enhanced my teaching in that it is certainly becoming more, just one more thing that you do use ... So I think the fact that it is just now part of the learning ... Mainly integrated studies, things like that for photos. We made a prayer in PowerPoint and we gathered all the cameras through the school and the kids went off and took photos and made their PowerPoints. Actually I sat with a couple and showed them how to download. It was very exciting. (Josie, interview, 30/10/2006)

Teacher confidence to try other forms of ICT

From the use of the cameras, some teachers have started to branch out and look at other technologies. The principal of one school was pleased to observe the integration of ICT. He stated that the teachers were driving the integration now.

It's not me driving it. They can now see the value in it. They're pushing towards that not me... It's already happening a little bit with the digital video camera. You can see now, the teachers don't know how to use a video camera, but they know the children [do], so they've moved away from being the all knowledgeable one to being the facilitators and they know that, yes, we can build this technology into my class, not because I know how to use it, but because the kids are confident in how to use it. (Philip, interview, 30/10/2006)

Comments like this from a junior school teacher confirm this. She is now thinking about where to incorporate the cameras, and planning on further improvement: "Now I use the camera where I wouldn't before. So that has been a real plus. I am starting to incorporate it into other areas ... I am hoping with practice it will get quicker and better" (Lesley, interview, 16/10/2006).

Teacher use of mentors within their own class and the school

Most teachers agreed that the mentoring model had possibilities for use in their classrooms, some stating it was already having an influence in their classroom. One teacher, Odette, was even team teaching with her mentor pair in her classroom on the use of the cameras. This teacher is continually discussing the possibility of further sessions for both the teacher and her class with the mentors' class teacher.

The appropriateness of children teaching

The use of the children in the mentoring process, particularly from Grades 3 and 4, was initially frowned upon by some. "Why didn't you use the grade sixes?" was a common question early in the research. In discussion with school administrators, I made the decision to use Grades 3 and 4 children as I was wary of preparing children that would move to new schools after only a year of the project resulting in their skills and knowledge being lost to the school. This came to be a wise decision as all staff commented that they were glad the children were not in Grade 6, as they wouldn't be able to access them next year. "The idea of using that middle school I found was great because I think getting to this stage of the year if it had of been Grade 6 I would be a bit panicky that I was losing my mentors" (Lesley, interview, 16/10/2006).

Many teachers commented that they hadn't realised the opportunities they had been missing out on in classrooms, utilising children as mentors. They realised it is fine for teachers to not be the all-knowing presence in the classroom.

It makes it okay to ask a child to teach you ... Sometimes you think if I ask a child to help me everyone will think I'm dumb, but if it's OK for a child to teach, if you make that the sort of the culture of the classroom, that it's okay to teach someone else, then I think that's valuable and it does change your thinking ... I'm quite happy to ask someone to show me ... it's hard to admit being an older person. You do have to admit you don't know a lot about computers sometimes and so you get the kids to show you but you might word it in a way that you know, I've forgotten how to do this, can you show me? (Rebecca, interview, 06/12/2006)

The idea of utilising all children became a focus in discussions about the classroom being a learning community where we all learn from each other. The mentor's classroom teacher was very happy to see that not only did the staff in the school gain from the sessions, but also the children learnt that the mentoring process actually worked, and that the teacher was not the font of all knowledge. She commented:

They understand now when I say go over and ask that person or ask that person. But before sometimes I think they'd give me a bit of a look "oh you just don't want to show me" get somebody else. I would say "go and ask somebody else and then come back to me if you still don't know." And I have always done that and I think now they realise "oh that other person might know as much" or more than [teacher] ... It doesn't have to be the teacher who has got the skill, you can ask anybody. (Angela, interview, 16/10/2006)

Teacher view of the children and their capabilities

It was interesting to see the recognition of the teachers of the capabilities of the students in their classrooms. All teachers commented on surprise that they felt at the confidence and skills the children showed in the implementation of the mentoring. One grade 5/6 teacher's comment summed up the staff feeling: "They've convinced me that there is nothing they don't know" (Teresa, interview, 06/09/2006). As will be evident in the following sections this became a common theme. This realisation was further developed in the teachers' insights into how narrow their vision was of the children in their schools.

Teachers' narrow vision of capable and not so capable children

One of the biggest surprises to teachers was the unexpected children who were excellent mentors. The coordinating teachers at both schools commented that they were very surprised by some children who shone in the role of mentors. As one stated:

Kids like Denis, who probably aren't the strongest academically, all of a sudden has this role, has his place and that's made him feel a lot more confident in approach to a lot of his work. He feels like he's got a bit of a leadership place because he's all stuck in the lower end so all of a sudden "I can do this, I am showing teachers, I am showing Grade 3s, people are asking me to come and help them with things, [the principal] is asking me". So he's all of a sudden he got a real confidence boost which has affected his, just his whole demeanour ... his self esteem. (Angela, interview, 16/10/2006)

When asked who she would not have picked to be a mentor if given the choice his classroom teacher was almost embarrassed to reply that this boy would be at the bottom of her list of choices. "I wouldn't know how much he would retain and be able to tell it back ... When I look at it, that would have been a real pity from

what he's got out of it" (Angela, interview, 16/10/2006). The principal also commented on the same child as least likely to be chosen.

I know that for Denis in particular this has just been a real confidence boost because he has suddenly become an expert in his class in this area ... it has been good and the kids have seen him as an expert, someone who they can go to and offer that support. So I think that has been really, really good for his whole self esteem and his confidence. (Philip, interview, 30/10/2006)

The teacher Denis mentored was most surprised of all.

I actually was really impressed with how much Denis knew, because often last year he was a struggler, with his work, and it's nice to see there's always something good they can do and it was nice to see that quality and him be able to be confident in that way... I thought anyone can do it. It actually made me realise that anybody, any child within that room would probably have been very good... I remember when I heard who I was having, I thought "Ohhhh" ... I wonder how it is going to go" and "I wonder how much he will know to share with me"... You know, with the right instruction even the slowest kid can feel proud about themselves and have something to share with somebody else. (Lesley, interview, 16/10/2006)

Similarly, at the other school, one boy stood out. His classroom teacher, the teacher he mentored and even his parents, all described him as a boy who had come a long way with the mentoring project: "Jeremy is one who has [had difficulties learning himself], and he is one of the kids whose parents have come in to say it has been amazing for him, and he is one of the kids who showed them, every week he would go home and show them something." (Elizabeth, interview, 25/08/2006). His mentee teacher has known him since he was five and "to see him, you know, to become a mentor was just overwhelming really for me, it was just because I had seen him struggle so much as a Prep, so it was overwhelming." (Moir, interview, 06/09/2006)

Improvement in teacher/student relationships

With all of this contact and these insights, the relationship between mentor and mentee was very likely to develop through this project. It has surfaced as the least expected, but most obvious factor in the data collected. As well as appreciating what they were learning, the teachers showed great interest in the children, and what this project and resulting relationship change had done for their skills, and confidence to impart those skills to adults. Teachers reported that although children seemed slightly apprehensive at first, once they realised that the teachers actually didn't know the information that they did, their confidence rose. One teacher spoke of her need to use the new skills because the children had taught her "I think now because they have shown me I feel, well I feel in a way, I feel, not obligated, like I feel as though I should, I have to now use the camera and practise the skills that they taught me" (Roxanne, interview, 23/10/07).

Teachers noted the fun they could have in the sessions and it was obvious they felt comfortable with the children teaching them. They came up with a variety of reasons why professional development with children was more successful for them than professional development with adults. These included the following:

- Children did not expect prior knowledge;
- Children were patient;
- Children were encouraging;
- Children explained clearly and step by step and were not annoyed by teachers requiring further or repeated explanations;
- Teachers didn't feel 'threatened' as they did at adult sessions where they felt great inadequacies compared to peers.
- Children were available, and
- Teachers enjoyed the sessions and saw the children did too.

Every staff member saw positives in the relationship developments from the session with the children. There were no negative comments received regarding the relationships built. These quotes sum up the feeling of the staff as a whole: "I felt the children just very, very different, they're more open, they're more, I don't know, there's just not that same threat ... I think they are prepared to go over and over things and they do it very differently to an adult who presumes you should know so much, where the children don't have the presumption" (Maira, interview, 6/09/07). "With an adult ... I might be more reluctant to show my weaknesses" (Rebecca, interview, 6/12/07). "I think the mentoring works because a teacher can then say hey, "slow down you have gone too fast" or "this is the direction I want to lead" (Lesley, interview, 16/10/07).

Educational Importance

I believe that this research has significance for all facets of education and to society as a whole. It is clear from multiple studies (Butler, 2000; Char, 1989; Clements, 1999; Johnstone, 2003; Papert, 1993; Spender & Stewart, 2002) that the use of computers is advantageous to students' learning. Large amounts of money have been spent on ICT equipment and the professional development of teachers in the use of these technologies (Victorian Department of Education, 1998; Victorian Department of Education and Training, 2005).

This spending has occurred in a context where society at large is given the impression that schools today are teaching our students about and with technology, therefore justifying the spending. Society is given this impression because administrators talk in numbers. They may state that their school has a ratio of one computer to five students, but of course this does not necessarily mean that these computers are actually well utilised.

Tenbusch states "the biggest obstacle to the implementation of technology in education isn't the lack of hardware, but rather the fact that many teachers aren't ready to use computers in the classroom" (Tenbusch, 1998, p. 1).

This study has shown the benefits of changing the relationship between teachers and children in schools through encouraging them to become partners in learning. It has enabled teachers to gain the support they need with ICT so they are ready and able to use computers in the classroom. It has allowed both teachers and children to let go of the false assumption that teachers are the

holders of all knowledge and allowed them to work together to develop the teachers ICT confidence, skills and knowledge so therefore to improve the uses of ICT in their classrooms. Added benefits of deeper teacher understanding of the children in their classroom and the broader school was an unexpected, but very welcome outcome.

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