

RESEARCH OF SCIENCE TEACHER EDUCATION: ENGAGEMENT OF “PARENTS”

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ABSTRACT

This paper discusses the design and development of a multimedia case-based environment, called PARENTS, for use in preserves science teacher education. PARENTS is being developed as one of the various products that will be used to communicate the knowledge, which is currently being generated by the “Ecologies of Parental Engagement”, the parental engagement in high poverty, urban elementary schools that are active in implementing reform-based science education - to a diverse audience: preserves teachers, school actors, practitioners and researchers, through an interactive multimedia environment. In the following sections we provide an outline of why and how such an environment was developed along with the rationale and principles that guided its design.

INTRODUCTION

The limited research on parental engagement in schooling reveals a deficit model relationship between teachers and poor urban parents. That is, many teachers consider low-income parents to be “deficient” despite their general intentions to be helpful (Davies, 1988; Delgado-Gaitan, 1996). The parent-teacher relationships might seem cordial but often are distant (Carrasquillo & London, 1993) and even hostile, as a result of long and complex histories of miscommunication and school failure (Wolfendale, 1989; 1992). This deficit model of relationship places teachers and parents into a cycle of blame. Cullingford (1996) states that when teachers are faced with rebellious students, often blame parents’ failure in teaching their children respect and proper behavior. On the contrary, many urban parents, frustrated by the decay in society and in schools, blame the teachers -and the schools in general- for the low academic performance of their children.

The “cycle of blame” is also found by other studies, which show that teachers often view children’s failure in school as a responsibility of the parents (Swap, 1993). Schools administrators and teachers favor parents who attend school functions (i.e. conferences) regularly and view those who do not as uncaring (Wolfendale, 1989; 1992). In addition, Swap (1990) reveals that despite the parents’ interest for more participation in their children’s schooling, many teachers are satisfied to have parents remain in “bake sale” roles.

Furthermore, other research studies reveal a number of barriers that poor, minority, and immigrant parents are experiencing in their attempt to be involved in their children education. Henry (1996) and Funkhouser & Gonzalez (1997) describe barriers such as the reluctance of teacher to allow parents' participation, biases and prejudices on linguistic or cultural differences as well as the school's -or the families'- unwillingness to collaboratively work towards a cultural change. Additional obstacles to parental engagement are considered the limited formal education and the deficient cultural or social capital of the parents, and the conception of parents and teachers roles (Samaras & Wilson, 1999). As a result, parents often end up with a school-controlled "laundry list" of ways they can be more involved in their children's education.

Nevertheless, the research around parental involvement in education provides substantial evidence that this involvement positively influences student school success (Dodd & Konzal, 2000a, 2000b; NRC, 1987, 1996). Hyde (1992) indicates positive impacts such as a) students and parents communicate about school more often, b) parents sharing feelings of accomplishment, c) increase in students' self-esteem, and d) student-staff and school-parent relationships improved. Moreover, other studies has shown fewer student referrals and classroom behavior problems (Flaxman & Inger, 1991), higher student attendance and high school completions (Swap, 1987), fewer student failures and higher student grades (Brandt, 1989), and more positive student identification with and acceptance of teachers (Comer, 1988). More importantly, these studies have indicated that parents do not have to be well educated in order to help their children with school.

Lastly, several studies have documented the ways teachers can involve parents in their children's scientific and technological discoveries both in school and at home (Feely, 1994; Fuller, 1996; Geake, 1993), including helping to design supportive home-based experiences. Fuller (1996) indicates that this type of initiatives open channels of communication between teachers and parents that potentially impacts both what happens at home and at school.

OBJECTIVE

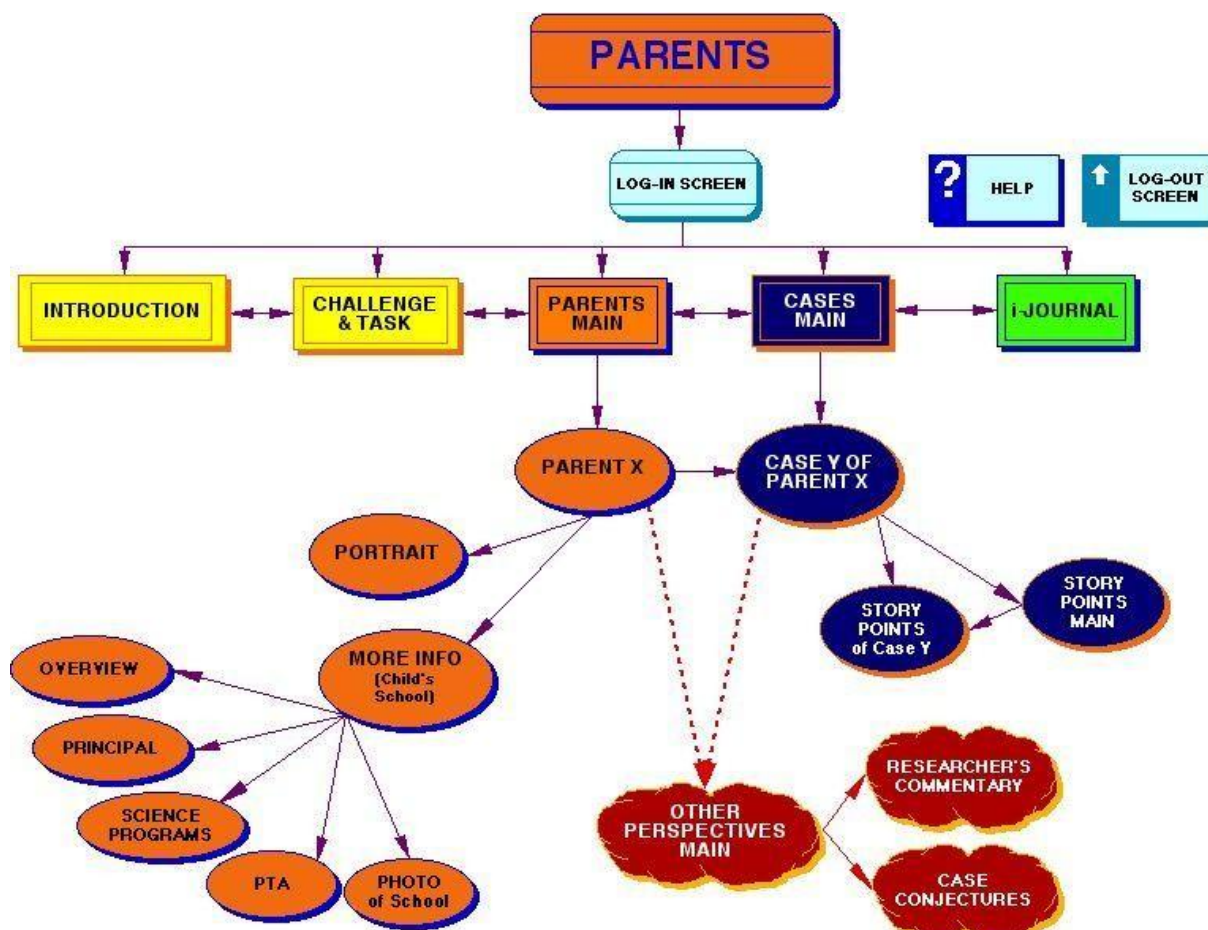
PARENTS are a multimedia case based learning environment. The main purpose of designing and developing the PARENTS environment was to help preserves science teachers explore and reflect on the themes of parental engagement in high poverty urban school settings. More specifically, through the use and interaction with this environment, we aim to help preserves teachers to:

1. Identify issues, problems, and ideas that are embedded in the multimedia environment by having them pose their own **questions** or **dilemmas**.

2. **Interpret** those questions from multiple perspectives, using the various information resources provided in the product.
3. Form their initial **conjectures** around the issues they identified and explored.
4. Provide **evidence** and supporting information, gathered throughout their interaction with the environment that will help them shape informed suggestions or solutions to their initial questions or problems as well as other “problematic situations” introduced by the system itself.

Beginning with these goals, our challenge was to design and develop a product that could be integrated into a preserves education course (preferably with preserves science teachers), and serve as both a starting point and a resource for exploration, reflection, and discussion of the aforementioned issues. We expect that implementing and testing a prototype version with a small number of preserves science teachers will provide valuable insights to our main research questions:

- How preserves science teachers’ beliefs and ideas about parental engagement in poor urban school settings crafted, mediated, or expressed within a graduate course that draws upon the PARENTS multimedia environment?
- What are the a) design features and functions, and/or b) content parts of such an environment that frame/enable/enhance student’s thinking about parental engagement in poor urban school settings? How (in what ways) this was achieved/done and to what degree? How each feature/function and/or content part contributed to students’ thinking?



The current version of PARENTS, as we described it above, was not only based on our design framework but also was the result of a) various pre-pilot tests we have performed with a small number of preservice science teachers, experienced teachers, and graduate students in science education, and b) the feedback we have received from the project's advisory panel. From both of these two sources we had some preliminary comments or suggestions in regard to:

- The types of questions, interpretations, and conjectures that a user might pose or construct, about the issues embedded in PARENTS, and how could this be further encouraged or promoted by the system (i.e. make the “Challenge” situation more authentic).
- The type and amount of contextual or other information that a user might need, in addition to the resources already provided. We detected that the “Other Perspectives” section was an important component that the users needed to view.
- The navigational and functional features that was available to the user at that point of development. Additionally, we had some indications on how these features affect the time that the users need in order to familiarize themselves with the system (i.e. find out

how the various menus, buttons, and screens work, or move from one screen to another, etc).

Following the theoretical framework of development research, the next step was to actually use this multimedia learning environment into the actual setting that it was aimed to: the first version of PARENTS was used by preserves science teachers who were enrolled in the “Elementary Science Methods” course, which was offered by the Science Education program at Teachers College, during the Fall 2002 semester. We employed various data collection methods in order to address the research questions we mentioned earlier: survey, classroom observations, collection of written artifacts, and interviews with students.

The exploratory and descriptive character of the study implies the use of a mixture of methods: we intend to use both qualitative and (basic) quantitative methods of data collection and analysis. The data analysis process will be ongoing and always in accordance to our research questions. Analytic procedures that are currently being followed include: a) organizing the data, b) generating categories, themes, and patterns, c) coding the data, d) testing some initial understandings, e) search for possible alternative explanations, and f) synthesize the final report. We expect to detect emerging patterns and themes in the preserves teacher’s beliefs around parental engagement as well as in the user-interface interaction. Further discussion on the research analysis and findings is out of the scope of this paper.

FUTURE SCOPE

The current prototype exhibits a set of limitations that will be taken under consideration into the next phase of its development. A major component that we intended to develop was an online component of PARENTS, which we called “Forum”. One of our goals at the early stages of design was to have a product that would be delivered partly via a DVD-ROM and partly through the World Wide Web. This component was in accordance to the constructivist principle of collaboration and negotiation: knowledge construction is mediated through social dialogue (Duffy & Cunningham, 1996). Learning environments, such as the one we have designed, should enable students to contribute to each other’s learning through collaborative activities (Dunlap & Grabinger, 1996; Black & McClintock, 1996). Given that collaboration is an important element in the development and the negotiation of understanding, we want the future users of PARENTS to potentially go beyond their individual problem solving abilities with the support of group members and successfully face “problematic” scenarios, that they would not have been able to accomplish on their own (Brown et al, 1989, cited in Dunlap & Grabinger, 1996). Our intention was to create a virtual learning community (Scardamalia et al, 1989, 1992, 1994; Scardamalia & Bereiter, 1993) where preserves teachers will have the chance to “go public” with their ideas: to make their thinking visible so others can asses and identify their understanding and others’, as

well as to leave a “legacy” for future users that can further encourage reflection (Schwartz, Lin, Brophy, & Bransford, 1999).

Nevertheless, taking into consideration the available time for production, our priority was to first develop and pilot the DVD-ROM part of this environment. Therefore, the “collaboration and negotiation” principle was actually followed in the graduate course setting. The use of PARENTS did not happen in a vacuum. We integrated this multimedia environment into the course in way that would enable students to interact with each other, discuss their ideas and beliefs with their fellow classmates and collaboratively work in groups in order to present and negotiate their final ideas or suggestions with the whole class and the instructors.

Lastly, let us remind the reader that this study should be seen as a first step of a continuous process of design, development, and evaluation of the under-development prototype version of PARENTS. Based on the findings and results of the first implementation of PARENTS, several improvements or modifications will be made. These results will also inform the tentative design framework we have proposed and provide insights for a) future development of the system itself, and b) the way this multimedia case-based environment could be integrated and be used in the most effective way in the preserves teacher education setting.

REFERENCES

- Abell, S. K., Bryan, L. A. & Anderson, M. A. (1998) Investigating preservice elementary science teacher reflective thinking using integrated media case-based instruction in elementary science teacher preparation. *Science Education*, 82, 491-509.
- Anderson, O. R. (1992). Some Interrelationships between Constructivist Models of Learning and Current Neurobiological Theory with Implications for Science Education. *Journal of Research in Science Teaching*, 29, 1037-1058.
- Anderson, O. R. (1997). A Neurocognitive Perspective on Current Learning Theory and Science Instructional Strategies. *Science Education*, 81, 67-89.
- Barnett, C. (1998). Mathematics teaching cases as a catalyst for informed strategic inquiry. *Teaching and Teacher Education*, 14 (1). 81-93.
- Bednar, A.K., Cunningham, D., Duffy, T. M., & Perry, J. D. (1991). *Theory into Practice: How do we link?* In G. Anglin (Ed.), *Instructional Technology: Past, present, and Future*. Englewood, CO: Libraries Unlimited, Inc.

- Belfiore, J. & Barton, A. C. (1999). Report: Supporting parents through advocacy, reform, and science knowledge. Technical Report. Wildlife Conservation Society.
- Brown, A. L. (1992). Design experiments: Theoretical and methodological challenges in creating complex interventions in classroom settings. *The Journal of the Learning Sciences*, 2 (2), 141-178.
- Brown, J. S., Collins, A. & Duguid, P. (1989). Situated Cognition and the Culture of Learning. *Educational Researcher*, January-February, 32-42.
- Calabrese Barton, A. & Drake, C. (2000). Ecologies of Parental Engagement Project. NSF Grant Proposal: REC 9980592.
- Cognition and Technology Group at Vanderbilt (CTGV). (1993). Designing Learning Environments that support thinking: The Jasper series as a case-study. In T. Duffy, J. Lowyck, & D. Jonassen (Eds.), *Designing Environments for constructivist learning*. Berlin: Springer-Verlag.
- Cognition and Technology Group at Vanderbilt (CTGV). (1997). *The Jasper project: Lessons in curriculum, instruction, assessment, and professional development*. Mahwah, NJ: Lawrence Erlbaum Associates..
- Duffy, T. M. and Jonassen, D. H. (Eds.) (1992). *Constructivism and the Technology of Instruction: A Conversation*. Hillsdale, NJ: Erlbaum.
- Dunlap, J. C. & Grabinger, R. S. (1996). Rich Environments for Active Learning in the Higher Education Classroom. In B. Wilson (Ed.) *Constructivist Learning Environments: Case studies in instructional design*. Englewood Cliffs, NJ: Educational Technology Publications.
- Education Trust. (2001). *Education Watch: The 1998 Education Trust State and National Data Book*. Washington, DC: Author.
- Feely, J. (1994). At home with science. *Primary Education*, 25(2), 26-39.
- Merseth, K. K. (1996). Cases and case methods in teacher education. In Sikula J. (Ed.) *Handbook of Research on Teacher Education*, pp. 722-746. New York: Macmillan.
- Merseth, K. K. & Lacey, C. A. (1993). Weaving stronger fabric: the pedagogical promise of hypermedia and case methods in teacher education. *Teacher and Teacher Education*, 9 (3),

283-299.

National Education Goals Panel, (1999). National Education Goals Report: Building a Nation of Learners. Washington DC: Author.

Schwartz, D. L., Lin, X., Brophy, S., & D. Bransford, J. D. Toward the Development of Flexibly Adaptive Instructional Designs. In C.M. Reigeluth (Ed.), Instructional-Design Theories and Models Vol. II: New Paradigms of Instructional Theory. Mahwah, NJ: Erlbaum.

Scribner-Maclean, M. (1996). Science at Home. *Science and Children*. 34 (2), 44-47.

Shulman, J. H. (Ed.) (1992). Case Methods in Teacher Education. New York: Teacher

