Creating Parentopia: Design-Based Research to Develop an Interface for Parent Learning Communities and Networks

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Abstract: Participatory design research was employed to create a virtual support and learning interface for parents and staff in an educational program for families and young children. Social constructivist perspectives on learning specific to the parenting role provided theoretical foundation for development. Platform design research validated user interest a complementary space for learning within class and wider program communities, and that integrated involvement of parents' personal social networks. An iterative design process identified tools and activities for initial prototype development, implementation and redesign. The time to identify platform and implementation features necessary to ensure further research proved a benefit. The natural evolution of system roles and supports, comfort with an innovation by parents and staff, and communication about the innovation over time has resulted in a shift in expectations about how learning and support takes place in the program.

Introduction

Information and communication technologies (ICT) offer parents new ways and a virtual environment for gathering information, problem-solving, forging alliances for support and connecting with experts (Wartella, Rideout, Lauricella, & Connell, 2013). Research suggests that personal and professional connections facilitated by technology benefit parents' emotional well-being, problem-resolution and skill acquisition (e.g, Plantin & Danebeck, 2009). Although short term online educational programs and specific applications (e.g., texts) are effective at strengthening parenting behaviors and knowledge (Hughes, Bowers, Mitchell, Curtiss, & Ebata, 2012; Nieuwboer, Fukkink & Hermanns, 2013), unexplored is the strategic use of technology as an interface for parents' learning communities and that integrates their natural networks that support the childrearing experience. This paper describes the design research behind Parentopia– an online complement to a community-based program for collaborative learning by parents and children in early childhood.

Design considerations

Theoretical foundations

Social constructivist, ecological orientations (Bronfenbrenner, 1995; Rogoff, 2003; Vygotsky, 1978) when applied to parent learning and adult development in the parenting role demonstrate the importance of meaningful relationships through which parents can reflect and explore cognitions about childrearing (Azar, 2004; Marineau & Segal, 2006). Learning to parent and about children's development is largely informal and experiential, fueled by cooperative interactions with trusted, familiar and proximal others who share childrearing roles, interests and identities. For some learning is aided by participation in informal parent support communities or more structured education opportunities. In the hands of skilled facilitators, guided interactions for collaborative learning with peers offer the parent critical reflection, validation of the parenting experience, and a deepened identity in the parenting role (Azar, 2004; Belsky, 1984), and identification of diverse perspectives and new strategies for parenting (Campbell & Palm, 2004; Thomas, 1996).

Ecological orientations also promote parent learning as occurring across multiple communities through networked associations (Barron, 2006). Within one's learning ecology the individual self-initiates activities that facilitate learning from one community to another. Repeated exposure to content in multi-community interactions deepens knowledge and improves confidence. And, although parents may rely primarily on proximal, shared identity communities for learning and support, peripheral, weaker tie connections provide novel perspectives and specialized information, and may broker connections to wider networks. Expanded network size, and diversified membership enhances parents' access to a breadth of information and access to social capital that promotes competent parenting (Cochran & Walker, 2005).

These socio-ecological foundations of parent learning offer new directions for technology design. Parents employ a range of technologies to maintain close ties, and to access a range of supports (e.g., Rudi, Dworkin, Walker & Doty, 2014; Stern & Messer, 2009). Connectivity functions of new media can also expose the parent's proximal communities to wider networks. Online communities for parents show promise for learning when it is facilitated in ways that promote safe spaces, and encourage deeper understanding through shared perspectives (Farmer & Reupert, 2013; Gray, 2004; Guldberg & Pilkington, 2006). For parents,

technology can play a critical role as an interface and mediator of multiple community and network member influences.

Hypothetically then, parent learning can be enhanced when social technology:

1. Provides continuity and enhances parents' experience with a community-based, program built on collaborative learning principles through online affordances,

2. Encourages parents' access to their personal social networks to share program content and engage participation in online activities, and

3. Diversifies, increases and strengthens the parents' wider program community for collaborative learning by expanding parents' program connections and affiliations.

ECFE as a parent learning community for technology design research

Most group parent education delivery models are structured toward improving the parents' knowledge or behavior through short-term experiences (Campbell & Palm, 2004). Some however, are built on relationship-based principles that foster a culture of sharing and sustained support for parents (i.e., knowledge networks) as they evaluate their beliefs and practices (Thomas, 1996). Ties developed through community interactions and responsibilities to the group foster parent self-efficacy and high community collective efficacy. As a result, social bonds are stronger and individuals gain empowerment. Ties developed through learning community interactions also foster collaborative problem solving and a shift in perspective from deeper understanding of diverse viewpoints and experiences.

A program that exemplifies this type of community-orientation to parent learning and support is Early Childhood Family Education (ECFE) in Minnesota (ecfe.info). Since 1984, ECFE has operated through local school districts, primarily through no/low cost adult learning and enrichment classes known as Community Education. ECFE is open to all parents of young children from birth through age five. Participation is encouraged throughout the children's first five years, providing families with continuity in learning, peer relationships for support and community resource connections. Weekly two-hour classes are held during the school year. Unlike other group parent education, ECFE does not use an established curriculum; learning goals are tailored to individual classes. Communication fostered through comfortable and trusting relationships moves the group toward synergy characteristic of a learning community (Wenger, 1998). Collaborative learning for parents in ECFE means transformation in perspective from reflective group dialogue. This technique brings the group to shared understanding of the problem, collective determination of alternatives, and individual application to fit unique parenting, child and family needs (Campbell & Palm, 2004; Thomas, 1996).

With multiple classes per site, parents who attend at one class time have the potential to expand their neighborhood/parenting communities through ties with those who attend other classes. ECFE's multi-faceted community-orientation and open systems framework to parent learning, and the program's own lack of presence on the Internet (other than for administrative or marketing purposes) offered a unique opportunity to create a platform that explores technology's role in extending community learning processes among parents, and capitalizes on networking affordances to build larger connections.

Design tensions

To design an online space for ECFE that would offer, as Preece observes "the virtual as a continuity of the real" (2000, p. 249), means to address the tensions, or endemic dualities and challenges for parents and staff with using online tools in concert with program participation. Introducing an innovation means identifying factors and the process for successful adoption (Rogers, 2003). A significant tension rests with the culture of learning and participation in a 40 year old program that has only operated face to face and challenges to program delivery expectations by parents, staff and administration. A related tension rests with the trust and security felt in a face to face program that protects the sensitivity of parenting discussions and parent fear of judgment.

Another relevant tension is between individual participation and group cohesion important to community learning and engagement. For parents of young children especially, whose attention is divided with life demands, identification with a learning community alone, and one that continues in an online space, is highly variable. Participation in organized instruction by adults is voluntary, and information and socialization needs may be satisfied by other sources. Parent participation with an online platform will vary by perceptions of usefulness to meet needs, application experience (e.g., social media as a successful resource for learning about parenting), and sophistication of technology use (e.g., Rothbaum, Martland & Jannsen, 2011). And while parents may be attracted to continue communication with their class communities, engaging with those in the program who are less familiar may take particular encouragement.

Therefore, given the hypothetical value of social technology to parent community-based collaborative learning, and the challenges posed by introducing innovation to an existing learning culture, the research questions driving this project were are follows:

1. Would a virtual platform for the engagement of communities and personal networks be viewed as complementary to existing ways that parents learning through a face to face program?
2. What are the design features that would make a platform useful and used by parents and staff?
3. What is necessary for the implementation and adoption of innovation?

Design research

The innovative nature of this project required a design assessment method to identify platform components that would convey ECFE principles, reflect parents and staff as users, and accomplish theoretical aims. Design-based research for technology enhanced learning environments (e.g., Wang & Hannafin, 2005) was selected. This method is grounded in relevant research, theory and practice, works with participants interactively and through iterative cycles of analysis and redesign, integrates mixed methods for data collection and analysis and connects results to the specific context.

The neighborhood site for platform development is in an urban Minnesota city, selected due to its 'readiness' for virtual adaptation and adoption by participants. The selected site is an established, familiar presence in the neighborhood, and offers seven classes each week (two are in Spanish). Data collected for this project in year 1 revealed that the majority of those attending this ECFE program are women (26% are fathers), ranging in age 26-58 (M=34.2, SD=5.5), with slightly more than half (55%) possessing a college degree and most reporting family incomes between $40K and $80K. Families have between one and four children; half report two children. The site is in a racially and ethnically mixed neighborhood; 21% of parents report non-white racial identity and although most parents report speaking English (85%), this amount includes parents who are bilingual. Participation in ECFE ranges, with a fairly equal distribution of parents attending their first, second, third, or fourth year. Staff include two licensed parenting educators (each with an average of 20 years of experience), one early childhood educator (with 10 years experience), and three classroom assistants.

Method

To answer the first research question and identify features for platform design, focus groups and a survey with parents, and staff interviews were conducted. These gathered in depth information on the ways that ECFE helps parents learn as a community, the intersections of parents' personal and ECFE worlds that provide learning and support, and ways that technology might extend ECFE's benefits. Focus group sessions were recorded then transcribed to text for coding, and transcription accuracy validated. Three coders independently coded transcript samples then cross-validated a coding scheme to be used for thematic analysis (Silverman, 1993). A primarily forced-choice survey elicited data on parenting supports, perceptions of value for ECFE, and on technology use. Quantitative analysis included descriptive reporting and internal comparisons.

Within the total sample 52 responded to the survey and 55 participated in the focus groups, representing 83% of the parents registered for classes at the site. Four instructional staff were interviewed Results of all analyses were shared back for validation and interpretation with staff and parents.

Following build of the prototype, usability testing with 8 parents (5 English speaking and 3 Spanish speaking) provided data for the second research question. Further data on was secured through a survey given to parents in all classes at the end of a 9 month school year (year 3) on site use, and site analytics were tracked to examine pages visited. Forty eight (of 56, or 85.7%) parents completed surveys representing those in English speaking and Spanish speaking classes. Staff interviews provided information for the third research question. All three teachers and three program assistants participated in the interviews. Data from the interviews was transcribed and coded for thematic analysis.

Results

Validating assumptions about community learning and network involvement

Analysis revealed that parents do view ECFE as a community for learning and use their personal networks as proximal supports for parenting. Word frequency in focus group descriptions of ECFE indicate the program viewed for 'community' 'learning' and 'support.' Further analysis identify the setting as being 'comfortable,' 'trusted,' 'nonjudgmental' and 'safe,' and even for some, like their 'church.' More than half (55.6%) identified ECFE as a source of emotional support; nearly all (94%) identified it as a valuable source of parenting information. Survey data revealed that discussion with other parents (4.56 out of 5) and expressing views on

parenting (4.33) as most highly rated learning methods. Also valued was getting information on child development (4.15), information on community resources (4.10), and learning activities to do with the child (3.94). The parenting educator was notable for facilitating collaborative discussion and access to expert information. Half (29, 56%) reported knowing no other parents at the site, not in their class well enough to ask for information or advice. Others reported knowing between one and four other parents. Staff interviews indicated that a variety of program-wide activities (e.g., clothing donations for families), events (e.g., spring festival, fund raisers) documents (e.g., program handbook, area guide) and physical spaces (e.g., site building, parent and child classrooms, and the neighborhood) represent an culture of program community engagement.

ECFE parents' personal social network connections represent proximal, strong ties (e.g., family) and distant, weak ties (e.g., professionals). Tie strength was indicated by the frequency of network member mentions during the focus groups, and by survey responses on the range of types of supports offered. Family, the co-parent and friends offer emotional, practical and informational support. Parents verbally shared information from ECFE with others; 81% share with their partner, 57% with a friend and 43% with their own mother/father. Discussion with the co-parent and other parents (in real life and online) helped parents validate beliefs, resolve conflict, boost confidence and get new ideas. Experts (like the pediatrician, and books) were popular information sources for specific topics, though sometimes information conflicted with what was gathered from more familiar sources.

Parents indicated that these network sources provide information that intersect with what is learned in ECFE:

[parent 1] "...and the same with the people that you come in contact outside of ECFE, they're bringing the knowledge that they have from other sources and experiences that they have..." "

[parent 2]: And it's definitely expanding your knowledge because we're not talking here, we're not talking about right and wrong, we're talking about..."

[parent 1] Ways to deal with situations."

[parent 2]: "ways to deal, could be a different idea sometimes and we exchange that and we might go and we go enriched out of the class because what we do, we live relationships wherever we go, you know, we bring that in, in and out. Dynamic."

These results reinforce the value of collaborative learning through membership in ECFE, and that parents' personal networks and ECFE operate as parallel and intersecting ecologies for their learning. They also validate parents' interest and their role as a conduit for information sharing across communities. And they suggest that the culture of the program offers a foundation for further program-community-family engagement.

Identifying online engagement activities

Analysis of survey items regarding technology use revealed that nearly all parents and staff were comfortable with and had access to computers, the Internet and cell phones (over 90% reported each). Just under three quarters (74.5%) owned smart phones; few (23%) had tablets. Texting and email were daily activities, and about half (48%) reported videoconferencing weekly (especially with extended family). Social networking (specifically Facebook and Pinterest), sending pictures and using mapping tools daily was reported by just over half. Participants were positive about technology being easy to use (4.25 out of 5), the value of technology to connections with family and friends (4.12) and the general usefulness of technology to their lives as parents (3.96). Analysis of parent and staff technology use and comfort supported use of applications that would be accessible and easy to use, and with English/Spanish translation options. A high need for privacy features (e.g., account approval, restricted access to classes) safety, and convenience (integration with existing social media accounts, mobile access) were recurring themes from focus group analysis of items on technology preferences.

When asked how technology could enhance ECFE's benefit, parents resoundingly asked for ways to maintain peer connections between weekly classes, and to access content about parenting and their child's learning shared by teachers. Activity interests for extending group class-based learning online included open discussion and document sharing, and member lists to connect with other parents. Parents voiced that virtual attendance and participation by the non-ECFE parent is particularly important to boost familiarity with the program and experiences that benefit the child. Parents also wanted easy ways to share the documents and content with others close to the childrearing experience (e.g., child care providers, extended family members). And they wanted easy ways to share information *from* others *to* the ECFE community (such as a website advised by a pediatrician).

Staff admitted little experience or familiarity with using online platforms for parent or child engagement, though they expressed open attitudes to learning and trying new approaches. They were particularly interested in a platform that encouraged wider program engagement and that would include efficiencies to their practice (e.g., staff to parent communication). They reinforced the need for technology that would secure confidentiality and the privacy of conversations, and underscored the value for technology that was easy to use and language flexible. Adherence to school district policies (e.g., use of release forms) was also mentioned.

The findings on technology use and preferences validated the social mechanisms of learning by parents in ECFE, and the value of a virtual platform that would enhance social connectivity to the class learning community, and integrate involvement by personal social network members, offering a clear yes to the first research question.

Feature usability and usefulness

Based on these findings, platform design considerations leaned on community orientations (Wenger, White and Smith, 2009) of *individual participation, relationship building, access to expertise, content, open-ended conversations, cultivating community and serving the context* to inform tool selection (Table 1).

Table 1: Design aims, considerations and components of Parentopia 1.0 and 2.0

Platform aims	Design Considerations	Community Orientations[1]	Platform components[2]
Facilitate class community learning and support	Maintain preferred activities Convey felt context of learning and community Provide easy connections to class members Privacy and confidentiality	Relationship building Open-ended conversation Content Access to expertise Individual participation	• Multi-topic discussion forum (R) • Chat tool (text, video) • Advice wiki: "Suggestion Circle" • Member directory (R) • Class identity (logo, pictures) (R) • Instructor moderation and presence (R) • Controlled access to class pages (R)
Involve the personal social network	Facilitate participation by non-attending parent and close others Easy content sharing out and in	Relationship building Access to expertise Individual participation	• Policies on platform roles and access (R) • Co-parent full access (R) • Account Moderation (R) • Visitor participation on program features • Content sharing through email, social media interface
Build the wider community	Create a public face for the community Replicate the look and feel of program participation Collaborative activities that appeal to range of personal interests Program information and organization Security	Relationship building Open-ended conversation Content Access to expertise Serving the context Individual participation	• Multi-topic discussion forum (all program) (R) • Resource area (document library, wiki, marketplace/exchange) • Filtered search tool (R) • Shared (Google) calendar w/ mapping, personalization (R) • Family photo sharing (R) • Staff and program information (R)

[1.] Wenger, White and Smith (2009).
[2.] R = Features included in Parentopia 2.0

Initial system design occurred through an iterative process with parents and staff over a nine month school year. Design features for the overall platform layout, individual components, visual appeal, and usability were created and refined with participant feedback and testing. The domain parentopia.org was selected for the platform to identify its unique role for the program, and as a potential domain home for future adaptations by ECFE sites (there are over 330 school districts with ECFE programs in the state). The designed prototype was built on Wordpress CMS with a customized social networking package to provide enhanced social interaction

capabilities (e.g., forums, chats, wikis, Fig 1a). A public landing page provided basic program information, account creation and log in; account moderation approves and directs further access to the site as visitor, parent, staff and administrator. All accounts access a program home page that presents program-wide images, information and distributed communication activities (e.g., calendar, access to class pages, announcements). Individual class pages include areas for open-ended discussion, member directory, and content contributions. Class page access requires a secondary approval to ensure privacy and safety. The site's static content can be automatically translated into English or Spanish. Parents and staff established policies on inviting non-ECFE members and partners to create accounts at visitor or parent levels thereby gaining read-only or interactive access to program-wide content.

The prototype was employed for an academic year to identify implementation issues and feature use and usability. Staff introduced the platform at the beginning of year and encouraged parent account creation and class membership. The platform was introduced to parents in classes, highlighting features of the full platform, individual class pages and user accounts. Staff were encouraged to begin using discussion forums to continue conversations about class topics, and parents were encouraged to use the class and full program discussion forums to share parenting information.

Figure 1a. Parentopia 1.0 main page site design.

Assessment of the prototype revealed that, as expected, the discussion forums were the component used most often; most other components (e.g., wikis, libraries) and individual content pages, were rarely visited. The majority reported using Parentopia a few times a month or a few times a year. Parents reported using specific features, like the calendar or viewing pictures of their children. Barriers to use included its lack of flexibility on mobile platforms, the distraction of many features, and users forgetting logins. Despite limited use, most however (62%) commented positively about the ability to connect outside of class. They expressed excitement over a mechanism that enabled their connections with other ECFE parents and staff and that could involve the co-parent and other family members.

Staff reported that parents varied greatly in their comfort with account creation and use, which prevented some from logging in. They felt that certain features hampered engagement (e.g., click through email notification of discussion posts). Because parents needed assistance and forgot logins, staff felt they needed to take time away from teaching to assist. Additional personnel or volunteers were unavailable to assist. Most staff also felt time-challenged to lead parent use of discussion forums and other features in their teaching, and on site management to maintain content. Despite these drawbacks, staff were very positive about having access to a complementary platform for engagement with parents.

Implementation and usability testing of the prototype informed a redesign of a streamlined, social networking prominent version (Table 1, Figure 1b), designed collaboratively with site staff and parents. Unique programming using JavaScript and web sockets mimics a Facebook like interface for familiarity, centralizing the main page as a news feed to feature posts, with side bar area for announcements, the shared calendar, photo album and filtered search tool. The user account retains avatar personalization, contacts, notifications, and private messaging. Access to class-only posts, announcements and images remains. While the 2.0 version heavily emphasizes the social media interface and mobile device integration, it retains the essential elements of the original prototype: integrity to user privacy and confidentiality, layout that facilitates ECFE program operations and the relationship-based, supportive nature of ECFE (e.g., affirmations to parents by staff).

Figure 1b. Revised Parentopia (2.0) site design.

Implementation insights

At the end of the school year of prototype use, teachers reported using a variety of techniques to encourage use by parents. The most frequently identified effort was posting in the class discussion forum following a class with a brief summary, question or sharing photos from the children's classroom. Instructors met together as a group through a Professional Learning Community monthly, and individually with assistants weekly and identified topics for posting. They also made an intentional effort to respond to posts made by parents to reinforce activity. By building in platform use as part of their regular instruction, over time the teachers felt that their interest and comfort in adopting the innovation increased. They observed that increasingly parents would note that an idea raised in class would be a good one to discuss through Parentopia. Or, parents would tell others to find a program event on the calendar. These indications of interest by parents were motivating to staff to continue, increase use and find additional ways to integrate into teaching.

Conclusion

This design research to develop Parentopia as a platform to complement social, collaborative learning in ECFE is both promising and realistic. Exploration of learning and social connectivity by parents and staff in ECFE validated social constructivist theories of parent learning as members of ECFE, and as ECFE can integrate with members of the parents' personal social network. And it validated parent and staff interest in an online mechanism to maintain learning and build wider, stronger connections for learning and family life. The design process revealed essential elements to execute the theoretical aims and essential context features in the program for implementation: technology that places social interaction as the centerpiece of the application, is mobile friendly, and offers privacy. Although it is not a unique application in its construction – the revised application looks and feels a bit like Facebook – introducing the innovation of a virtual space for parent engagement to a program that reaches busy and distracted parent users requires that it start with something simple and familiar (Milheim, 2007). A user-friendly friendly interface is also an essential ingredient for a publicly funded nonformal education program with limited staff time, money and resources for technical support.

The participatory, iterative process of design and testing offered another critical dimension to adopting innovation in this traditional program: time (Rogers, 2003). In short, the design research over four years stimulated the cultural shift and expectations of how ECFE helps parents learn while at the program and away through virtual social interaction, and how ECFE needs to support use of a virtual platform. Parents' idea of a virtual space, interaction with it, and feeling its benefits, and staff comfort with how to integrate it into instruction on balance with costs and challenges developed over time. The resulting acceptance and desire for a complementary, virtual space for continued engagement as a class and as a community holds great promise for creating a true collaborative learning ecology to strengthen and support parenting. And with this capital, further research on the actual benefits to parent social learning through their communities and networks has a firmer foundation to occur.

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