Improving Personal Home Pages to Support Learning as Becoming and Belonging

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Abstract: Recently, Communities of Practice has emerged as a new framework for rethinking learning. It moves us beyond learning as doing and sense making and into learning as becoming and belonging. In order to study issues of becoming and belonging, we must focus on the role of identity in the community of practice. If we are interested in tools that reify that identity, then personal home pages, particularly for the academic community of practice, are a natural place to look. However, we are not convinced that traditional home pages are meeting these learning needs in an adequate way. Based on our previous research and experiences, we theorize three technological ways that these home pages can be improved. Most importantly, we feel conventional home pages fail to offer ways for other members of the community to participate—they fail to be collaborative. To better understand how current home pages meet the needs of the community of practice members and how these needs can better be served, we conducted a survey to assess the state of current home pages, in a potentially informative community of practice.

Keywords: communities of practice, personal home pages, design experiment, CSCL

Learning in a Community of Practice

There are no clear boundaries between the development of knowledgeable skills and the development of identities; both arise as individuals participate and both become central to the community of practice. (Barab and Duffy, 2000, p. 29)

Previous efforts in the learning sciences have been primarily focused on theories of learning that relate to acquiring and practicing cognitive skills (Collins et al., 1989; Bruer, 1993; Schank et al., 1994). Most of these efforts have been situated in the classroom—a safe environment for learning largely separated from the outside world. The hope is that the cognitive skills learned in these practice fields will be useful later in life as people engage in practices that require these skills. Yet, there is a great deal of learning that occurs outside of the classroom setting (Lave and Wenger, 1991). Recently, communities of practice has emerged as a useful framework to go beyond the cognitive view of learning to incorporate the social (or situated) aspects of learning (Wenger, 1998).

Communities of practice are integral to our daily lives. We all belong to them. Families develop practices, routines, histories, etc. Workers organize around their immediate colleagues. Scientists meet at conferences to discuss their findings and make connections with fellow researchers. Students go to school, adapting to both what the learning institution imposes on them and the complex social network of their classmates. Alcoholics rely on a network of fellow alcoholics to avoid temptation (Lave and Wenger, 1991). New employees learn to become claims processors (Wenger, 1998). Each of these are examples of a community of practice in action. They all have a rich history and developed practices. Their practices and meaning are reified in artifacts, tools, symbols, rituals and conventions. New members are able to join and participate. Peripheral members are able to move to more central positions. The practices of the community evolve along with its members. Instead of seeing these elements as largely separate from learning, the communities of practice framework allows us to see these as central to issues of learning, meaning and identity (Wenger, 1998).

Seen through this conceptual framework, the previous learning sciences work addresses two important aspects of learning: learning as doing (engaging in meaningful practice) and learning as experience (understanding meaning) (Wenger, 1998). However, it largely fails to address the other two important aspects of learning: learning as becoming (identity) and learning as belonging (community). Mostly, this is because most of this research has been done in the context of schools, rather than directly addressing learning in a community of practice (Barab and
Duffy, 2000). Yet, these are two critical components for a community of practice to sustain and reinvent itself (Wenger, 1998). Newcomers must be able to integrate themselves into the community.

Learning as becoming focuses on how a person learns who they are in the context of the community (Wenger, 1998). A carpenter is not just someone who has carpentry skills, but someone who views themselves as being a carpenter. No matter what they do, they are a carpenter, because that is part of their identity. Learning as belonging focuses on the individual's role in the community of practice. To belong to the community, the participation of the individual must be legitimate (in-line with the practices of the community) and visible to the other members of the community (Lave and Wenger, 1991). In a sense, learning as becoming and learning as belonging are two sides of the same coin looked at from different perspectives. In the former, the focus is on the individual's view of themselves. In the latter, the focus is on the community's view of the individual. It is both the individual and the social sides of things that are being addressed by these two concepts. Both are almost necessarily developed jointly as an individual joins a community of practice. When a person belongs to a community of practice, they become someone who shares the individual character traits that go along with that community. Conversely, when a person becomes someone with the traits of the community, they will belong to that community of practice.

Communities of practice establish meaning through two fundamental complementary processes—participation and reification (Wenger, 1998). Participation is concerned with how members of a community interact with others and how the participants see themselves in relation to the community of practice. Reification is concerned with how artifacts and tools, rather than people, reflect the practices of the community and are used by that community. If we seek to understand learning as belonging and becoming, then we should examine how these processes affect it. In this work, we will concentrate on the reification. We seek to find a setting where people's identities are reified in a way that is useful to the community of practice.

**Reifying Identity in Home Pages**

Personal pages and the world wide web are not being used to “publish information;” they are being used to construct identity—useful information is just a side effect. (Erickson, 1996, p. 15)

In the academic community of practice (academia), personal home pages serve as one foundation of how people express themselves and present themselves to others (Dillon and Gushrowski, 2000; Groth, 1998; Erickson, 1996). Home pages provide their owners with a forum to reflect on their own thoughts through composition and a way to publish those thoughts in a meaningful manner to others. Composing thoughts into writing has been shown to be a particularly useful process for people to reflect on their understanding and change that understanding by doing so (Berente and Scardamalia, 1987). In addition, constructing an artifact for a real audience can be motivating (Papert, 1991). Thus, increasing the visibility by publishing to an actual audience should increase motivation for the composition and provide a concrete audience to address. Thus, from a learning as becoming perspective, home pages provide a meaningful setting for individuals to work on their identity. On the other side, publishing information, even informally, is a legitimate way to engage the academic community (Smith, 1999). Sharing your ideas with others through publication are core practices of academia. As such, from a learning as belonging perspective, personal home pages provide a way for people to participate in core practices of the field in a way that is visible to the community.

While (in theory) personal home pages have the potential to support an academic community of practice by enabling learning as becoming and belonging, (in practice) conventional personal home pages fail to serve this function for the vast majority of users. Informally, browsing home pages, we find that few academicians use their personal home page for more than posting contact information and distributing publications. While this kind of use does have a significant role in academia, it only scratches the surface of the potential that personal home pages can have. In this work, we seek to go beyond this surface level. To do this, we must understand the reasons why the use of personal home pages normally stops there and what the potential is when users get beyond this surface. In particular, from a research perspective, it is important to be able to link those reasons to issues of becoming and belonging. However, there is good reason to believe that the reasons for the lack of adoption are largely technological—they are based on the features of current tools rather than the underlying concepts.
Since we are concerned with studying the underlying concepts, we should try to eliminate these technological reasons. This approach falls squarely within the design experiments framework for learning sciences research (Cobb et al., 2003; Brown, 1992). In a design experiment, researchers seek not just to study, but to improve on learning. By doing so, the concepts for study will become clearer as the conditions for their use are improved. As such, to better study the role of personal home pages for reifying community, we look to eliminate the purely technological reasons for home pages not reaching their potential. In this paper, we concern ourselves with the current state of personal home pages and finding a trajectory for improving that state by removing the purely technological problems. Based on our previous research and experiences, we hypothesize three such problems—content creation is not guided, publication is awkward, and interaction is not facilitated.

1. Content Creation is not Guided

Most conventional website-creation tools, such as Microsoft FrontPage™, do not scaffold content creation. They are designed to be used for many different applications. An artist can create a gallery for displaying their work. A company can create their website to match their corporate image. A fan can create an homage to their favorite TV-show. A graduate student can create a site for potential employers to look at prior to a job talk. All of these users have different needs, but they all have the same website-creation tool. So, that tool is not particularly well suited for scaffolding any one of those tasks. For our purposes, users are left with a large open canvas that can be so overwhelming that users never get beyond creating the looks of their site to focus on generating the useful content (i.e. text) that is useful to the community of practice.

As an example, in our previous work on collaborative-website (CoWeb) use in English-composition classes (Rick et al., 2002), the teacher found that the simplicity of CoWeb actually helped improve the quality of students’ work. For their final project, students were asked to create a website. In previous terms, students had designed their sites using conventional website-creation tools. Though the teacher had emphasized that she was primarily interested in content, students tended to focus on looks to the detriment of content. When students started using CoWeb, this changed. CoWeb, like its ancestorWikiWikiWeb (Leuf and Cunningham, 2001), was designed to facilitate content creation, not creating a great-looking site (Guzdial et al., 2000). If we want users to use websites to construct their identity, then their tools should support them in that task.

2. Publication is Awkward

For most conventional websites, the publication cycle is long and awkward. In order for a person to make changes to their home page, they need to call up special website-creation software. Next, they need to find the file that needs changing. Then, change it and save. If the user is not on a machine that has direct access to the source files, two extra steps of downloading the original source file and uploading it back to the original server are required. In the community of practice that we wished to study, an additional problem was found—most home pages did not update publicly until the next day. All of this can be a large barrier to quick changes and keeping a home page up to date.

In order to realize the potential of home pages to reify identity in a community of practice, these barriers to adoption can be problematic. For learning as becoming, individuals will make less use of home pages. So, they have less chance to reflect on their role in the community. For learning as belonging, the individual will create less content. So, the community has less reified identity to attribute meaning to.

3. Interaction is not Facilitated

Most home page tools do not facilitate interaction with others. This limits functionality as collaboration is not even an option. For example, if a graduate student was scheduling a time for their thesis defense, their home page is a logical place for the committee to coordinate schedules. With conventional software, this functionality is not even an option. If a personal home page is to support a community of practice, then interaction (participation) is a fundamental part of that. So, conventional website-creation tools may not allow those useful activities to emerge.

In our previous work on collaborative websites to complement classroom learning (Guzdial et al., 2001), we found that teachers and students were able to invent new activities using CoWeb which went well beyond the functionality of a static course website. So, we expect that a collaborative personal home page will encourage useful activities that cannot be found in conventional (static) sites.
Additionally, static pages limit the feedback that a users gets about their home page. Since awareness of an audience is a critical part to both the composition process (Bereiter and Scardamalia, 1987) and provides a motivation to construct an identity (Bers, 2001), limiting that awareness hampers the composition process.

The Study: Personal Home Pages

To investigate the current state of personal home pages supporting a community of practice and establish a trajectory for how current home pages can be improved to meet those ends, we conducted a survey. As an audience, we chose first year Ph.D. students in the College of Computing at Georgia Tech. We chose them partly out of convenience (i.e. we have easy access to them), but also because they are an interesting / appropriate group to study, both for theoretical and practical reasons.

On a theoretical basis, they are an interesting group to study as they are faced with strong issues of learning as becoming and learning as belonging. They are beginning to define their identity in a well established (history, rituals, publication conventions, etc.) community of practice (Sumner, 2002). Almost all of them are new to the academic community of practice (both the computer science research community and the College of Computing community), but over the next few years they aim to become central to both. So, they are on a trajectory from the periphery to the core of the community of practice. In the College of Computing, they are well supported in this endeavor. All first year students are required to take an introductory class on graduate studies. In that class, they learn about the different areas of computing and how to pursue research in those areas. The main part of the class revolves around several small (~20 hours of work) projects that the students do with potential advisors.

On the practical basis, College of Computing students are well equipped to letting home pages be an important tool for their joining the community of practice. By most measures, they would all be considered experts in dealing with web technologies. They are not afraid to use technology. They have easy access to those technologies and use them on an almost daily basis. As part of the introductory course, they have to create a personal home page and at least post write-ups of their projects to it. So, they have enough experience creating websites that that should not prove to be a major barrier to entry. So, the technological learning-curve should not be a major barrier for them adopting home pages as an integral part of their participation in the academic community of practice.

We surveyed 24 first year Ph.D. students in the College of Computing at the end of their first year. At this point in their program, these students are still on similar trajectories from the periphery to the core. So, there is good reason to think that this is a fairly uniform group that is largely distinguished (for our study) by how much they use home pages. For analyzing their responses, we averaged responses for four different subgroups, depending on how much time they reported spending on their home pages:

- 9 students reported spending less than 4 hours per year
- 5 students reported spending between 4 and 11 hours per year
- 8 students reported spending between 1 and 3 hours per month
- 2 students reported spending between 1 and 2 hours per week

Nobody reported spending more than 2 hours per week, so no fifth group was necessary. We are primarily interested in two subjects. First, how is the current state of their personal home pages affected by use. Second, how can that state be improved—how can barriers to adoption be improved and what is necessary for home pages to be more useful.

The Current State of Personal Home Pages

One of the central questions we wanted to find out was for what purposes people used home pages. Did they use them for school-related activities, to learn HTML, etc.? Participants were asked how often they used their home pages to do various activities, suggested by the prior literature (Erickson, 1996; Groth, 1998) and issues we felt important to our study. For the sake of simplicity, the four groups were reduced to two groups—13 participants spending less than one hour per month and 9 students spending more than one hour per month on their home page. Figure 1 show how participants responded to nine of these categories, based on these groupings. Two categories (using their site for commercial purposes and as a journal or web-log) are not shown, as the responses were so negative that we can safely conclude that neither group used their sites significantly for those purposes.
As shown by the Figure 1, most of the different uses increased for the “more than one hour per month” group. The only use that decreased was the use of the home page for school-related activities. From examining the actual home pages of the participants in the “less than one hour per month” group, it was clear that the high rating of school-related activities is due to that those graduate students did not use their home pages much more than the original usage in their introductory class. So, almost all of their use can be characterized as part of a school-related activity. It is interesting that this group of students also considered this usage to be a work-related activity, as that was a close second response. It is a good indication that the activities of the introductory class introduce students well to the concepts of informally publishing (an activity essential to their community of practice) their work, by posting it to their home page. Additionally, the top-rating for work-related activities for the higher use group gives a good indication that personal home pages are actually being used primarily for engaging the academic community of practice. To further investigate which communities of practice are actually being served by student’s home pages, participants were asked how useful they felt their home pages were to various groups. The results are shown in Figure 2.

As shown in Figure 2, most students felt that their home pages were more useful to their colleagues and strangers that shared their interests than to their friends or family. So, again, there is good reason to believe they largely see their page as something important to the academic community of practice, rather than for personal connections. So, there is good reason to believe that this line of research line is potentially productive. In addition,
we see that personal home pages are actually useful to the person creating them, increasingly so with use. Since, the student is the only one to contribute to them, it is an indication that the reflection of constructing their identity in their personal home page is actually useful to themselves, one of the key elements of making an identity construction environment work (Bers, 2001). So, we find evidence that personal home pages are meeting the needs of being important to a community of practice, particularly for those few that use them more frequently.

**How to Improve the Current State**

In the previous subsection, we were concerned with showing that there is enough potential in personal home pages to further research it. In this subsection, we are concerned with how to improve that potential, so that there is a higher degree of adoption and that those who adopt it find it more useful.

Something that is often a barrier to entry for any advanced technology project is prior experience. Since we are studying College of Computing graduate students, we did not feel that lack of familiarity with Internet technologies would be too problematic, but we did ask several questions to establish prior knowledge and tried to coordinate it with adoption. No noticeable trends were found; for many of the questions, the less using groups were more Internet savvy than their counterparts. What was apparent is that this group altogether was highly experienced using Internet technologies, so for our further research endeavors, prior experience should not prove a hurdle.

Part of what makes collaboration useful is knowing you have an audience. So, we asked how aware survey participants are of who visits their home pages; the responses organized by averages of the four groups are shown in Figure 3.

![Figure 3: “You are fairly aware of who visits your home pages.”](image)

For all usage groups, owners tended to disagree that they knew who visited their home pages. There is little indication that higher adoption of conventional home pages actually increases the awareness of an audience. So, there is good reason to think that conventional home pages fail to serve audience awareness needs, even for those who adopt them. This gives good indication that our intuition of “interaction not being facilitated” leading to less awareness of audience is viable.

To test how we can improve on conventional home pages, participants were asked if they wished they could more easily update their page and whether they would like for others to contribute to their home pages. We are particularly interested how those issues would affect adoption rates. The averaged responses by group for these two questions are listed in Figure 4.
In general, those in the less-using groups did not find that they wanted others to contribute to their web pages, so it is doubtful that collaboration can be a method to entice them to adopt web pages. Yet, there does appear to be a use for collaboration. There is an increase of those looking for others to contribute as usage increases. So, there is a good indication that collaboration is actually something that adopters of personal home pages would want as part of that medium. As far as ease of the publication cycle, there is good reason to believe that it can actually be improved and that even non-adopting users find it to be something that they wish for. Examining the data carefully, it was clear that for many respondents this was an important issue as several strongly agreed with the statement (wishing that it was easier). This was not as well reflected in the averages (as several also strongly disagreed), but it could be a strong influence on both adoption of personal home pages and using them to their full extent for several users.

**Future Work: Realizing Collaborative Personal Home Pages**

In this paper, we have demonstrated that there is research potential for studying learning as becoming and belonging in the context of personal home pages in academia. We have shown that current home pages do, to a reasonable extend, serve as reifications of identity for one community of practice. We have also shown how we might improve current technology to make those issues more salient. By closely examining how collaborative personal home pages can contribute to learning as becoming and belonging in the specific setting of academia (more specifically, in the College of Computing at Georgia Tech), we hope to shed light on the role of identity construction and publication tools in supporting a community of practice.

Based on this work, we created AniAniWeb (a system for creating collaborative personal home pages) to address these technological shortcomings. We took in account what has been learned from standard home pages, wikis (Leuf and Cunningham, 2001) and other collaborative web-sites (Guzdial et al., 2000), and weblogs (Mortensen and Walker, 2002). As AniAniWeb addresses the three technological problems with conventional home pages examined in this paper, we believe that the possibilities for learning as becoming and belonging will emerge for a larger group of users with AniAniWeb than standard home pages. So, we will also have the opportunity to see why users do not adopt home pages for social rather than technological reasons. In addition, the importance of audience awareness and collaboration to learning as becoming and belonging will be easier to address through this platform.

**Endnotes**

1. They are practice fields in the same sense that a basketball practice field is a place to practice for the game (Senge et al., 2000).
References