Online Learning Community Software to Support Success in Project Teams

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***Abstract*—In this research we explore aspects of social interaction and community as they relate to success in project-based courses. Using specialized online community software consisting of social networking technologies and project-based wikis, project teams are able to collaborate and interact as they progress towards project milestones. Our study underscores the importance of sustained engagement as a means for fostering high levels of community and how these levels relate to project motivation and, ultimately, project success. Guided by a theoretical model that explains how individuals collaborate within online communities, we measure member perceptions of the software before and after our intervention. Survey results found that online learning community (OLC) software can successfully support learning and social interaction. These results are supported by a social network analysis (SNA), which shows high levels of individual engagement across the project lifecycle.**

Keywords—Social Networking; Online Learning Community; Wiki; Project Management; Capstone Project

I. INTRODUCTION

It is easy to take the World Wide Web for granted, which turned 25 in March of 2014. And it is easy to forget that, for most of the 21st century, electronic peer-to-peer (P2P) communication occurred through postal mail and land-based telephones. This was true for the average person as well as individuals pursuing advanced education. Today, while these forms of communication are pervasive as ever, they are no longer the primary means of P2P for certain demographics, such as digital natives, or those individuals having grown up with internet technologies.

It is estimated that 86% of digital natives participate in some form of online social networking (OSN), with some estimates as high as 98% [1] [2] [3] [4].

In this research, we leverage this population's technical prowess for social media to implement online learning community (OLC) software, which increases interaction, enhances levels of community and supports learning. More specifically, we implement OLC software in senior-level information technology (IT) capstone courses, which require students to work in project teams and construct a final IT artifact. We measure our interventions through survey research and a social network analysis (SNA) to discover how OLC software, comprised primarily of OSN technologies, provides students with an enhanced project space; one that fosters higher levels of interaction and learning and strengthens course community.

The rest of this paper is structured as follows. In Section II we establish the conceptual background for academic communities emphasizing the role online community software plays within project-based course communities. Section III provides a theoretical framework that bridges constructivism, engagement theory and social presence theory. Section IV focuses on the design of the OLC software. Section V highlights the research methodology. Section VI describes the results of this research. Section VII provides comprehensive discussion and analysis of our results section. Section VIII identifies the limitations of this study. Section IX is the conclusion section followed by references in Section X.

II. BACKGROUND

A. Academic Communities

When individuals enter college, they join the college conversation, and intrinsically become a part of the academic community. Academic communities can be classified as one subset of what Lave and Wenger [5] have coined communities of practice. In such communities, individuals work together towards common goals, collaborate on common problems, share best practices, support one another and share in a common identity. Thus, successful academic communities, as suggested by Adams and Freeman [6], help to sustain engagement and collaboration among individuals whereby knowledge building becomes an intrinsic function of the community itself.

B. Project-based Course Community

Courses can be considered a more specialized form of academic communities [7]. In this research, we focus our attention on specific types of courses, capstone courses and, in our case, team-based project courses.

Within the IT industry, team-based projects are recognized as a core component of effective undergraduate education [8] [9]. The inclusion of team-based projects into the undergraduate experience is largely influenced by industry expectations that graduates exhibit high-levels of problem solving, oral and written communication, teamwork and project management skills [10] [11].

One way for students to prepare to meet these expectations is through capstone projects. Capstone projects-based courses are valuable ways for students to prepare for

 ISBN: 978-1-61208-436-7

careers in their respective industries. While there are many approaches to this type of experiential learning, one approach considers individuals working within project teams, which allows individuals to build critical team-based skills and learn how cooperation and group dynamics plays-out as they work towards the completion project milestones. This notion is supported in Lainez et al. [12], who state that capstone projects in IT should deliver important skills such as 1) a basic understanding of business processes, 2) a product development with high-quality concerns, 3) know-how to conceive, design, implement and operate medium-size complexity systems and 4) communicative, initiative/leadership teamwork, analytical and problem solving and personal abilities. Furthermore, Ayas and Zeniuk [13] state that learning within project teams can be instrumental in building communities of reflective practitioners.

And these experiences are well received by students. Dunlap [14] discovered that engaging students in learning and problem-solving activities reflects the true nature and requirements of workplace communities and help students feel better prepared to work effectively in their profession, a viewpoint is supported by students [11]. Furthermore, Clarke [15] identified that industry-aligned projects increased student confidence and allowed students to explore areas of IT not covered in the curriculum.

Ultimately, within IT capstone courses, students are presented opportunities to consolidate their understandings of "systems analysis, software development lifecycles, specific software design support tools, entity relationship modelling, entity life histories, database design, web site design, or web server programming" [16]. Furthermore, when students engage in experiential learning, they become active participants in the learning process, constructing their own internal knowledge through both personal and environmental experiences [16] [17]. Lynch et al. [19] found that capstone projects provide students the opportunity to build, not only technical skills of the discipline, but the social aspects of systems development as well.

As a means to facilitate project communities and senior capstone courses, we incorporate an online learning community that allows students to participate across multiple dimensions of the project lifecycle, while also working towards project milestones.

C. *Online Learning Community Software*

Thoms et al. [7] [19] [20] argue that OLC software, constructed from underlying OSN technologies, offers benefits over traditional learning management software (LMS) within higher education. As touched upon earlier, project-based courses can be seen as niche types of communities. In such communities, individuals take equal ownership in content production and work towards developing a unique voice.

OSN technologies include a large array of Web 2.0 technologies such as asynchronous online discussion boards, blogs and wikis along with peer-to-peer networking and file sharing to name a few. These tools empower individuals to take ownership of their content while also making it easier to communicate and interact with other members of the community. Thus, constructing an OLC that more closely resembles OSN environments makes sense, since the overwhelming majority of individuals within higher education (i.e. digital natives) are already competent with these technologies. With roots firmly planted in OSN technologies, OLC software offers the greatest potential for facilitating a communal space, while also facilitating knowledge construction and learning in a higher education setting [7] [19] [20].

III. THEORY

To help guide the design and construction of an OLC to support our project-based needs, we follow a holistic theoretical model represented in Figure 1. The model considers, at its core, 1) the individual, 2) how individuals engage in online media through technology and 3) the overall sense of online community that results from active participants.

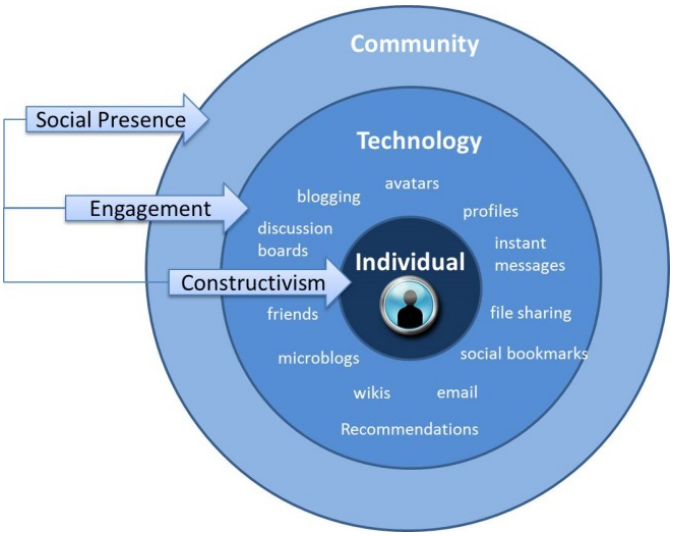

Figure 1. Theoretical Model for Online Learning Communities

A. *Individuals (Constructivism)*

Prior research has traced the roots of online communities to constructivism [21] [22] [23]. Consequently, at the center of our model we place the individual. Constructivism states that learning stems from the interactions and experiences of the learner [24] [25]. We believe that these interactions and experiences can be directly influenced by a user's engagement with OSN technologies. OSN technologies can be configured to facilitate many different types of participants. Largely linked to the work of Piaget [25], who first theorized that learning can be based on the interaction and experiences of the learner within a specific context, constructivism provides a holistic view of individual learning and how individuals interact within larger groups. Hagstrom and Wertsch [24] state that constructivism encourages, utilizes, and rewards the unique and multidimensional characteristics of the individual throughout the learning process. Additionally, Squires [26] states that constructivism

 ISBN: 978-1-61208-436-7

focuses on individual control, with individuals making decisions that match their own needs. While constructivism began as a theory of learning, it has progressively been used as a theory of education, of the origin of ideas, and of both personal knowledge and scientific knowledge [27]. Specific to this research, our OLC is comprised of individuals, who occupy a shared space, whereby she or he is influenced heavily by interactions with technology and others. Consequently, it is not unlikely that individuals will experience the community in different fashions.

B. Technology (Engagement Theory)

Research has linked student engagement to grades and motivation [28]. Thus, getting participants engaged in course project objectives early on can be tantamount to the project's success. Engagement theory states that individuals must be meaningfully engaged in project activities through interaction with others, which can be facilitated and enabled through specialized technologies [29]. Dalsgaard [30], whose research is supported in Waycott et al. [31], argues that social software can be used to support the constructivist approach set forth in the previous section. Social software engenders a cooperative approach to learning and work towards the establishment of a cohesive community. In this respect, social software can refer to any loosely connected application where individuals are able to communicate with one another, and track discussions across the internet [32]. Consequently, the development of OLC software must consider the individual's point of view in such a manner that they are provided with a certain level of control and autonomy within the community. Once again, social software supports these philosophies and makes participants the locus of control within a self-governing environment.

C. Community (Social Presence)

We introduce Social Presence Theory to understand the manifestation of our OLC as a dynamic and vibrant collaborative project space. Social Presence Theory looks at the degree to which an individual's perception of the online community, affects his or her participation [33] [34]. When an individual believes that others are interacting and exchanging information, that individual may be more inclined to engage themselves. As discussed in Garrison et al. [35], alternative methods for enhancing social presence must be explored to help substitute for the lack of visual cues individuals receive in face-to-face settings. Research by Richardson and Swan [36] identified that a student's perceived level of social presence directly relates to their perceived learning. This suggests that increasing levels of community can yield higher levels of learning. OSN technologies work well in this regard and have successfully helped enhance social presence through peer feedback [37] and individual profiles and avatars [38], both of which are implemented within the OLC designs we investigated. Additionally, Thoms [39] discovered that OSN technologies can foster higher levels of course learning through openness and collaboration and can align very well with course learning objectives.

Together, these three theories provide a holistic model that considers course community, individual learning styles and how each can be influenced and enhanced with technology.

IV. COMMUNITY SOFTWARE DESIGN

Just prior to the Web 2.0 revolution, Preece [40] stated that OSN developers can control the design of OSN software, but it remains difficult to control social interaction across the software. This statement implies that not all social technologies will yield the desired level of interaction intended by their design. After the Web 2.0 explosion, an influx of new social software presented software developers with a treasure-trove of open-source plug-and-play technologies, which have now become staples of popular OSNs. These technologies include filesharing, blogging, status updates, tagging, social bookmarking, and individual and community profile building.

Elgg is an OSN engine and is currently used as the primary engine across numerous online communities. The software provides a wealth of social technologies and has an easy-to-use and customizable interface, which can mirror the look and feel of any organization. A default installation of Elgg provides features such as discussion boards, blogs, file galleries and peer-to-peer (P2P) networking capabilities. Elgg also offers the ability to create sub-communities, a crucial feature that allows academic instructors to implement multiple communities within a single Elgg installation. Sub-communities allow instructors to separate courses, while allowing students to interact with peers outside their respective course community. Additionally, Elgg allows restrictions across multiple levels, including individual-level, community-level and logged-in-user-level restrictions, making it a choice system for project-based communities, who may wish to limit the availability of project information to the larger course community.

Illustrated in Figure 2 is the user landing page for a typical Elgg community, in this case, the community is the capstone course homepage. Within this environment, members are also able to add customizable modules to the homepage that presents them with real-time community activity. By default, users are presented with active content from across the site, which can be filtered by user or date. Rather than be reactive, our OLC is proactive, and a greater emphasis is placed on content creation, content dissemination and user-interaction.

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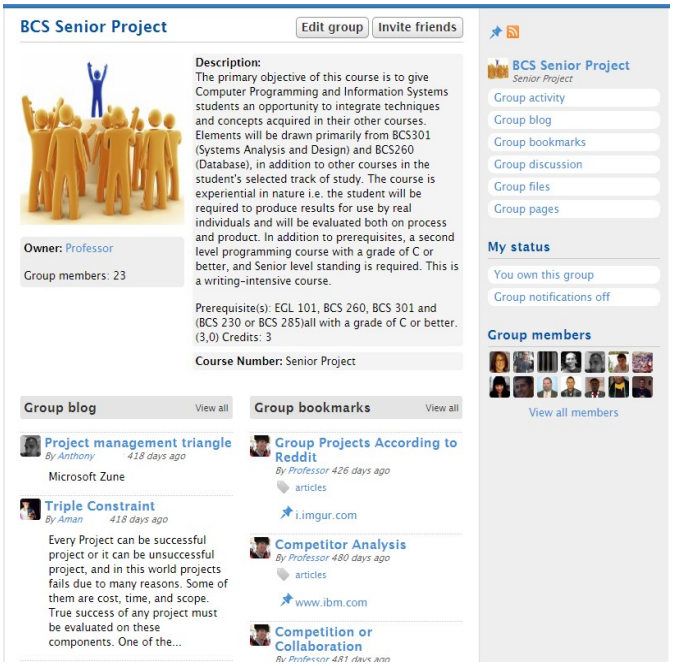

Figure 2. OLC Landing Page

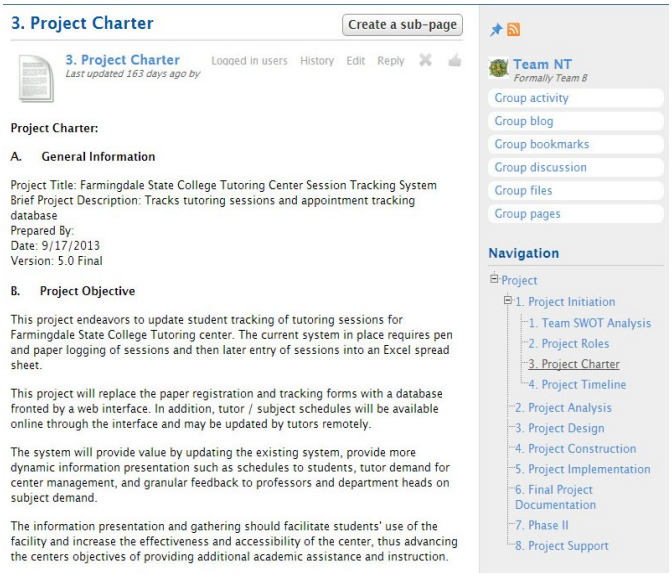

Figure 3. OLC Wiki Page

A. *Collaborative Writing Software*

The primary artifact within a project-based OLC centers on the analysis and design of project objectives. As a shared artifact, collaborative writing software functions as a mechanism to support information sharing and group knowledge construction. As one subset of collaborative writing, wiki software utilizes Internet-based technologies to facilitate the collaborative writing process by keeping track of page creation and page edits. Not only are wikis an effective mechanism for obtaining information and knowledge, such as with Wikipedia, the world's largest encyclopedia, they are also an effective technology for facilitating virtual collaboration. Wikis provide a shared dialogue and centralize information among collaborators in group projects. Additionally, wikis allow members to engage in group learning and share in knowledge construction within a virtual community [41]. These notions are paramount for project teams working collaboratively towards shared goals and shared understandings. Additionally, a wiki can provide project teams with a level of coordination and synchronization not afforded by other means.

Wiki technology was developed prior to the Web 2.0 explosion and, thus, limited collaborative writing to early HTML-style markup [42]. Today, wiki-technologies allow collaborators to breathe life into wiki-documents through multi-media and allow editors to embed files. Illustrated in Figure 3, today's wikis are no longer syntax-based, with difficult HTML-style markup notation. Current wikis embed rich-text editors, which allow novice web users to participate, a notion that is particularly important for student groups, many of whom have limited experience with wiki-technology. Recent research by Xu [43] implemented wiki-technology in project-based computer science courses, highlighting how wiki technology helped tcentralize and capture all project activities through wiki pages created by both the instructor and students. Additionally, Popescu [44] discovered that wikis also helped students to find interesting information; by reading other teams' wiki pages, students could check their progress, see how they compare with others teams, look for inspiration and models and discover different ideas and approaches. A limitation identified in He and Yang [45] is that a wiki should not be a tool that aims to supplant communication channels and works best when additional modes exist. This limitation is accounted for in our OLC since the wiki comprises only one component.

V. RESEARCH METHODOLOGY

To measure how OLC software supports levels of project community and leads to project success we targeted capstone courses at our university, a small public university in the United States. Our research can be categorized as a proof-of-concept case study, where we look to measure the effects of a specific intervention on existing populations of university students taking a required capstone group project-oriented course. The IT capstone course consisted of six project teams whose seventeen-week endeavor focused on constructing a fully-functional information technology (IT) artifact. Project

teams consisted of three to four students and were formulated by the instructor prior to the start of the semester.

The final IT artifact consisted of 40% of an individual's course grade. An additional 30% included project documentation and collaborative activities relating to project analysis, design and construction. Additionally, each project team was assigned a wiki space with pre-defined templates for project development phases. Groups were encouraged to communicate both synchronously during weekly in-class meetings and asynchronously through each groups' designated project space. Each group was required to present and defend their final IT artifact at the end of the semester.

Data was captured over the six-month intervention and include both pretest and posttest survey data in addition to a social network analysis (SNA).

As exploratory research, we are largely concerned with discovering mitigating factors surrounding learning, social interaction, course community and project success within OLC software. Our theoretical model asserts that, when members are presented with tools to support interaction and community, higher levels of social presence and course community will exist. At a high level, we ask what affordances and constraints OLC software provides in facilitating project collaboration and project success? Specifically, we ask the following research questions:

R1: Will an OLC enhance levels of course community?

R2: Will wiki software enhance levels of project management and collaboration?

R3: If R1 and R2, will an OLC facilitate project success?

To explore these questions, we measure the impact of our customized OLC software within our IT capstone course. The course is experiential in nature and students are required to produce results for use by real individuals and are evaluated both on process and product. While individuals were encouraged to use the OLC to discuss all project-related material, it was not required for project milestones.

VI. RESULTS

To explore how specialized OLC software can support project-based courses and enhance classroom learning, we collected data from multiple sources. Our first point of data collection is through survey research, which measures perceived levels of learning, community and interaction. To support survey findings, we perform a social network analysis and look at in-bound and out-bound interactions among OLC participants.

A. Demographics

Demographic information was captured through a pretest survey. Including the instructor, our total user population was 25. 25% of participants were female and 75% were male. 48% of participants were aged 18 to 25, 36% were aged 26 to 35, 12% were aged 36-50 and 4% were aged 50 and above. All interventions occurred using a capstone IT project-based course, a required upper-division IT course.

B. Survey Data Analysis

Closed-ended survey pretest and posttest questions were distributed to all participants resulting in 25 completed pretests and 23 completed posttest surveys, or a 100% response rate for both sets. To ensure confidentiality, no personally identifiable information was collected, thus linking survey data and SNA data was not achievable.

1) Instrument Reliability

Cronbach Alpha scores for our survey constructs related to items associated with the OLC scored .83 indicating that survey items maintain an adequate level of internal consistency.

2) OLC Perceptions on Interaction (Pretest)

Illustrated in Figure 4, on factors relating to OLC interaction, pretest results identified that individuals agreed (52%) or strongly agreed (32%) that interaction through an OLC would be important, with 40% agreeing and 40% strongly agreeing that the OLC will increase interaction.

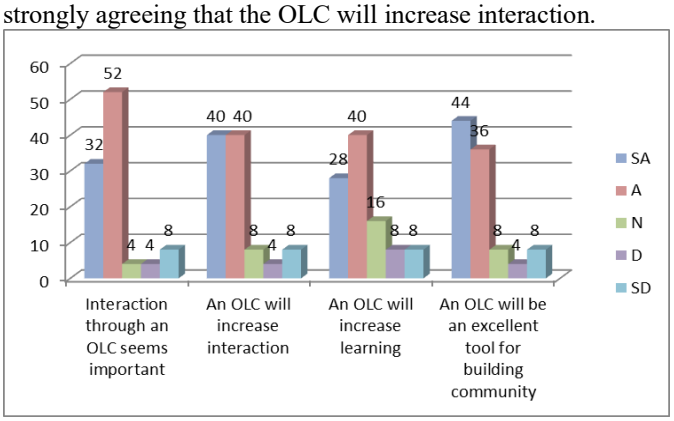

Figure 4. OLC (Pretest)

3) OLC Perceptions on Interaction (Posttest)

Illustrated in Figure 5, on factors relating to OLC interaction, posttest results show higher levels of agreement across these constructs. Individuals agreed (39%) or strongly agreed (56%) that interaction through the OLC was important, with 44% agreeing and 44% strongly agreeing that the OLC increased interaction.

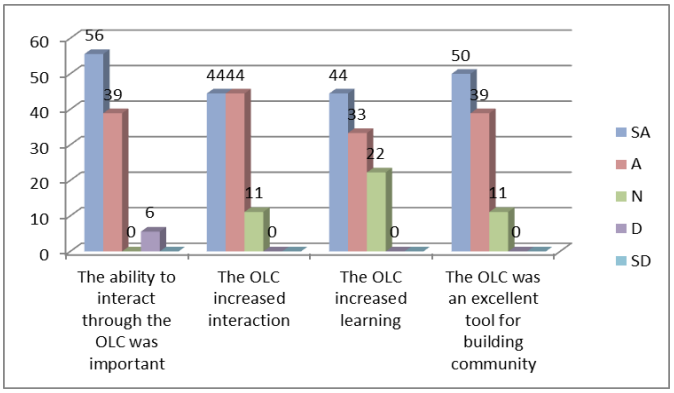

Figure 5. OLC (Postest)

4) Wiki Perceptions on Interaction (Pretest)

Illustrated in Figure 6, on factors relating to wiki interaction, pretest results identified that individuals agreed (48%) or strongly agreed (32%) that a wiki would facilitate group cohesion. Additionally, individuals agreed (40%) or strongly agreed (32%) that a wiki would facilitate group

collaboration. Individuals also agreed (40%) or strongly agreed (32%) that a wiki would facilitate group interaction.

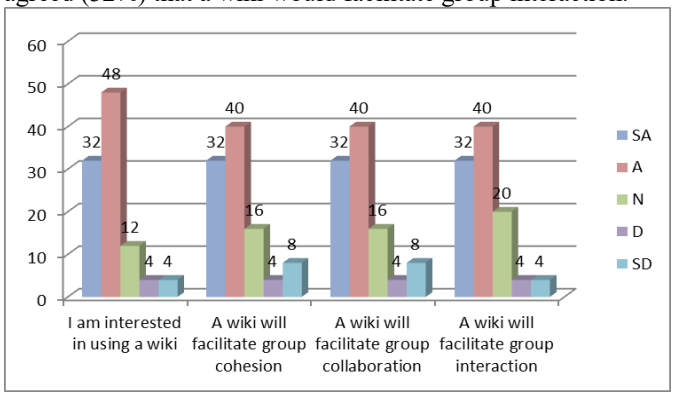

Figure 6. Wiki on Interaction (Pretest)

5) Wiki Perceptions on Interaction (Posttest)

Illustrated in Figure 7, on factors relating to wiki interaction, posttest results show higher levels of agreement across these constructs. Individuals agreed (61%) or strongly agreed (28%) that the OLC wiki facilitated group cohesion. Additionally, individuals agreed (50%) or strongly agreed (39%) that the OLC wiki facilitated group collaboration. Individuals also agreed (56%) or strongly agreed (33%) that the OLC wiki facilitated group interaction.

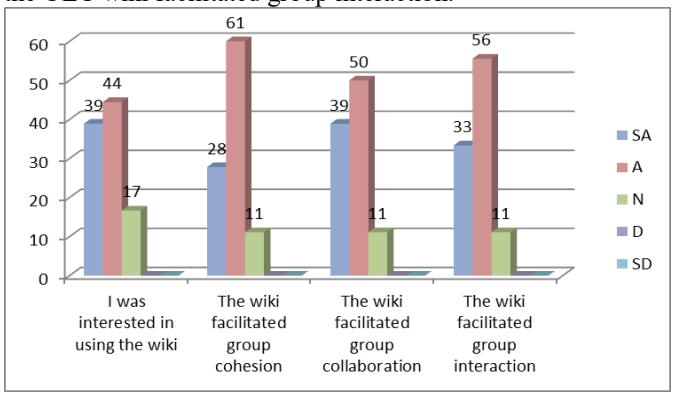

Figure 7. Wiki on Interaction (Posttest)

6) Wiki Perceptions on Project Management (Pretest)

Illustrated in Figure 8, on factors relating to project management, pretest results identified that individuals agreed (52%) or strongly agreed (28%) that a wiki would project management. Additionally, individuals agreed (40%) or strongly agreed (36%) that a wiki would facilitate content creation. Individuals also agreed (44%) or strongly agreed (36%) that a wiki would facilitate the organization of project content.

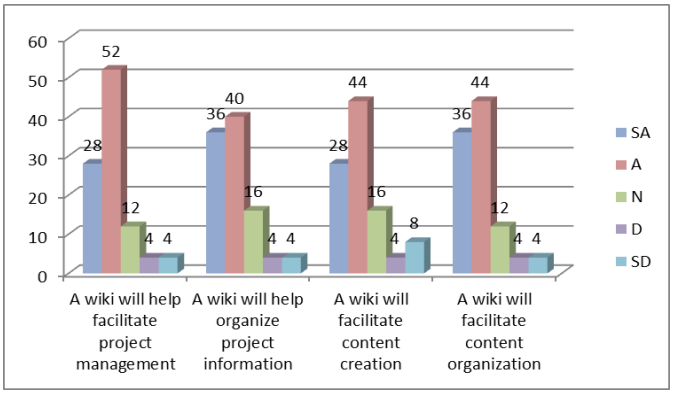

Figure 8. Wiki on Project Management (Pretest)

7) Wiki Perceptions on Project Management (Postest)

Illustrated in Figure 9, on factors relating to project management, posttest results show that individuals agreed (50%) or strongly agreed (39%) that the OLC wiki facilitated project management. Additionally, individuals agreed (50%) or strongly agreed (39%) that the OLC wiki facilitated content creation. Individuals also agreed (44%) or strongly agreed (50%) that the OLC wiki facilitated organization of project content.

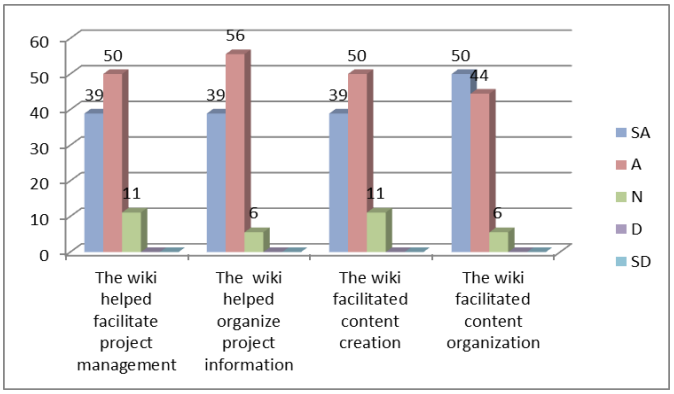

Figure 9. Wiki on Project Management (Posttest)

C. Social Network Analysis

1) SNA Background

A social network analysis (SNA) is often used to identify interactions that take place within a community. Specifically, SNAs can provide a visual analysis of the social network and allow for a better understanding of all participants in the process of learning and interaction across online environments [46]. The ability to view social graph structure and community evolution is crucial to successful facilitation of a learning design and can serve as an early indicator of its success [47].

2) SNA Design

We constructed our SNA graphs using the 2014 NodeXL Template for Microsoft Excel. NodeXL is a free and open source extension that provides a range of basic network analysis and visualization features [48]. Utilizing the Fruchterman-Reingold Algorithm to generate a force-

directed layout, we are able to position team members (aka, nodes) in our graph so that all edges are of more or less equal length and there are as few crossing edges as possible. Additionally, each arrow represents a weighted interaction, where larger arrows indicate a greater number of interactions between participants. Furthermore, bi-directional arrows occur when there is interactivity between students, measured in-degree / out-degree values. A high average value for in-degree / out-degree indicates those students more frequently interacting with one another.

3) OLC Sociogram

Illustrated in Figure 10 is the sociogram for our capstone course. Project team members are identified by the group letter and group project grade. For example, B2(92) was the second member of Group B, whose final project grade was 92 out of 100. Overall, the course experienced high levels of interaction with 1299 total aggregate interactions. Average in-degree and out-degree was also high at 8.1 meaning. In other words, on average, each student communicated with 8 other individuals. Additionally, the total number of unique edges, or communications between any two nodes was 186.

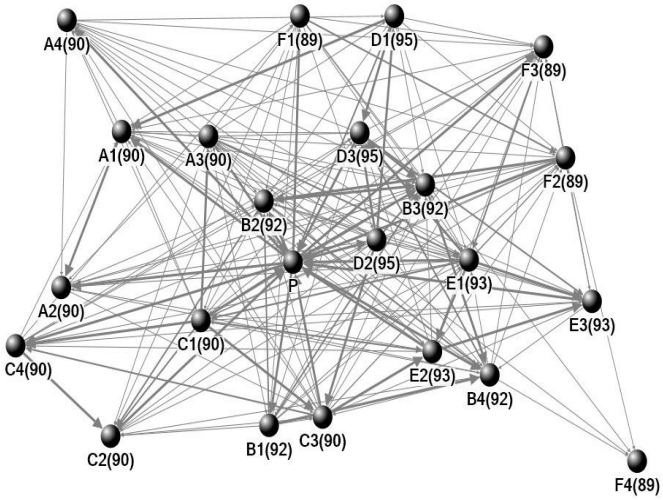

Figure 10. OLC Sociogram

VII. DISCUSSION

A. OLC Supports Community (R1)

Our first research question, R1, asked if OLC software could enhance levels of course community. To answer this question we look at a couple of factors. Community can be measured in terms of social capital, or the common social resource that facilitates information exchange, knowledge sharing, and knowledge construction through continuous interaction [49]. Furthermore, Social Presence Theory looks at the degree to which an individual's perception of an online community, in its entirety, affects his or her participation in that community. Therefore, our first point of reference focuses our attention on survey responses relating to the OLC software's ability to enhance interaction and community. Encouraging pretest results showed that individuals were positive from the start that an OLC could be important (84%). These perceptions continued throughout the lifecycle of the intervention and it was more encouraging to discover higher levels of agreement that the OLC was, in fact, an important factor for facilitating interaction (95%). Similarly, pretest results showed that individuals were positive that an OLC could be an excellent tool for building community (80%). And, again, posttest results supported these perceptions, revealing even higher levels of agreement (89%). The fact that the OLC is an open environment allowed team members to review the progress of their classmates and pose questions and receive responses in an open dialogue.

Our second factor for measuring community focuses on the SNA sociogram. Illustrated in Figure 10, it is evident that the OLC was an active and engaging community. In fact, the average in-degree/out-degree was 8, which indicates that a third of all participants interacted with other members of the OLC. An additional factor considers the large number of unique peer-to-peer interactions (186), which means that many members were communicating with many other members. This factor reinforces the notion that OLC software provides a high affordance for individuals to discover and connect with other members of the community in addition to those members from within their respective project teams. As this community building was exactly the goal of our OLC software, the presented results confirm that the developed OLC software provided affordances for students to cultivate their collaboration skills in team-based IT projects. These findings are particularly important as employers increasingly ask their employees to work in virtual teams [50]. Furthermore, we interpret these important results as a sign that the team-based IT project employed in this study was industry-aligned.

B. OLC Wiki Supports Project Management (R2)

Our second research question, R2, asserted that the OLC project wiki would enhance levels of interaction and facilitate team collaboration. To answer this question we consider a couple of factors. First, we focus our attention on survey responses relating to the OLC wiki's ability to enhance group cohesion, collaboration and interaction. Similar to R1 results, it was encouraging to find that the majority of individuals believed that the wiki could facilitate cohesion (72%), collaboration (72%) and interaction (72%). More so, however, it was very encouraging to discover the higher levels of agreement in the posttest that the wiki actually contributed to higher levels of cohesion (89%), collaboration (89%) and interaction (89%). Engagement theory is concerned with meaningful engagement. This amounts to finding the right tools for the right projects. Wiki software is geared towards collaboration and interaction where individuals bear witness to the evolution of a project's analysis and design. Wiki software also reinforces the notion that projects can be both user-centric and group-oriented, thus facilitating individual ownership and motivation.

Referring back to the sociogram in Figure 10, the proximity of nodes reflects that these nodes interacted with one another more frequently. In other words, the closer a set of nodes are to one another, the more cohesive that group of

nodes are as a unit. As one would expect of our capstone project teams, with the exception of Group F, all groups exhibited high levels of team cohesion. This outcome was largely to be expected since individuals, while functioning as part of the larger course community, were still responsible for working within their own respective project teams in order to accomplish project milestones. Taken together, the quantitative results at hand indicate that students utilized OLC to set achievable project goals, resolve misunderstandings about design decisions, and negotiate deliverables, similar to the way team-based IT projects function in the real world. In this way, collaborating students used one another as a resource for learning, while also working to complete their project milestones.

C. OLC and Wiki Supports Project Success (R3)

Our third research question, R3, asserted that based on the successful adoption of the OLC as a mechanism for fostering interaction and supporting community along with the successful adoption of the wiki to support project collaboration, the OLC would attribute to project success. Our results indicate that this concept is also well supported.

An important measure of project success stems from a group's ability to establish the parameters of success through analysis of business requirements and the design and construction of the IT artifact. It was clear that the OLC helped to contribute to this success as identified in both survey responses and in each project team's final product. From the pretest survey responses gathered, it was encouraging to discover that the majority of individuals believed that the OLC wiki would facilitate project management (80%), information organization (76%) content organization (80%) and content creation (72%). More so, however, it was encouraging to discover higher levels of agreement in posttest responses, where individuals perceived that the OLC wiki did, in fact, contribute to higher levels of project management (89%), information organization (95%) content organization (94%) and content creation (89%). Each of these factors is an important dimension of project management that promotes a shared understanding of technical requirements, which helps to mitigate expensive and time consuming rework. This concept applies to both short-term and long-term IT projects.

Consequently, the combination of 1) an OLC, which facilitated member interaction and course community and 2) wiki software, which allowed individuals to collaborate towards project milestones, allowed each team to successfully meet capstone project expectations and deliver a final IT artifact that represents understanding of business processes.

D. OLC Supports Technical Learning

Finally, an important consideration should be discussed surrounding the introduction of social software within an academic setting for learning purposes. While the merits of the OLC as a mechanism for project success and/or enhancing levels of academic community may be debated, the introduction of specialized social software, such as an OLC, into team capstone courses provides a number of tangible and intangible benefits not measured completely in this research.

In today's dynamic business world, social software is pervasive across the IT sector. Additionally, capstone courses are one of, if not, the final course for students majoring and graduating with IT diplomas. Consequently, introducing students to how communities of practice engage in information sharing and knowledge construction using such technologies identified in this study may go a long way in preparing those students for similar communication and interaction in the IT industry.

VIII. LIMITATIONS

We acknowledge that a number of limitations exist in this research. One limitation considers using an academic setting as an environment to measure the impact OLC software has on project-based teams. While we acknowledge that this does limit the generalizability of the study, it should be noted that there are numerous similarities between computer supported learning and working teams that make knowledge gained in one setting applicable to another setting [51].

Another limitation considers the relatively small sample size analyzed in this study. While we acknowledge this fact, our primary goal is to showcase OLC software as a proof-of-concept for enhancing collaboration among project-based teams, which we believe we succeed in doing on a number of levels.

IX. CONCLUSION

In this research we leverage the technical prowess of todays' digital natives and measure the impact of specialized OLC software on project success within teams participating in IT capstone courses. Our software allowed individuals to function within close-knit project teams, while also participating within a larger academic community of practice. Through the analysis of survey data and supported through a social network analysis, we discovered the powerful and positive impact OLC software has on supporting project success by facilitating peer-to-peer interaction and enhancing levels of collaboration.

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