Office of Educational Access and Success (OEAS), University System of Georgia

In collaboration with

Center for Advanced Communications Policy (CACP) and Center for 21st Century Universities (C21U), Georgia Institute of Technology

# Development of Virtual Communities of Practice to Support Programmatic Efforts within University Systems

## Some Considerations and Recommendations

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**Executive Summary**

As articulated by Etienne Wenger (1999) and other scholars, the "community of practice" (CoP) represents a useful organizing concept for enhancing collaboration, sharing knowledge, and disseminating best practices among researchers and practitioners in postsecondary education. Specifically, CoPs may further efforts made by university systems to support programs for the enhancement of science, technology, engineering, and mathematics (STEM). Such communities may involve program directors, support staff, affiliated institutions and their faculty, and other educational partners. CoPs may be developed to support a variety of objectives, including community development, communication and collaboration, and sharing of knowledge and practices. To facilitate its operation, encourage stakeholder buy-in, and minimize costs, we believe the development of a virtual (or online) CoP may be ideal for these systems. In this document, we outline the potential of developing online, virtual CoPs using Web-based tools such as Microsoft SharePoint. Technology alone is not sufficient, however, and our recommendations underscore the need for organizational support and individual participation.

# 1. Introduction to Communities of Practice

Most commonly, a "community of practice" (CoP) refers to a group of people united by a common goal, usually the sharing of professional knowledge or practices (Wenger, 1999; Cox, 2005). This ideal permits a community to persist over time, despite changes in the composition of the community's membership (Cox, 2005). A primary aspect of a CoP involves the cultivation of relationships between experts possessing practical knowledge of interest to the group as a whole, while a secondary concern involves the socialization of newcomers to the group. The social relationship between these two groups—established practitioners and novices—facilitates the transfer of knowledge and ensures continuity within the community (Jin, Wen, & Gough, 2010).

Originally an online strategy for business, a CoP also refers to a group of individuals who share experience, comprehension, information, and resources about an area of common interest. It could be defined further as a group of individuals who share common causes, capabilities, or problems within a certain field, discipline, or context. They establish a formal community with the explicit purpose of allowing members to deepen their knowledge and expertise through ongoing interaction. This form of knowledge management and manipulation has many effects on learning in various sectors and on various scales. There are three elements of a CoP: 1) a domain, or a defined set of issues, 2) a community, or network of relationships, and 3) practices, or standardized ways of "doing things" (Lin & Lee, 2006). These three elements—domain, community, and practices—draw upon various iterations of social and professional networking.

A CoP's domain can be any set of issues that a networked community decides to address. Collaboration on research projects, business endeavors, technological innovation, advocacy training, educational approaches, or matters of public policy may all be considered relevant domains of knowledge. Unlike social networking websites soliciting feedback and consumer opinion, CoPs are more than one-way channels for information dissemination or solicitation. CoPs are also more than a social connection. They are a vehicle for knowledge management not in one place, but in many places at once. With differing types of knowledge, practitioners can obtain, contribute, reshape, or critique knowledge, in any manner that is consistent with a given CoP's norms and standards. This horizontal movement of communication fragments power and authority and allows more people to become producers of knowledge themselves.

## 1.1 Virtual Communities of Practice

With these social and functional considerations in mind, CoPs historically have been bounded by geography. Without efficient forms of communication, members of the group from differing locations have not benefitted optimally from the dispersion of knowledge (Jin, Wen, & Gough, 2010). The most efficient form of communicating knowledge within a CoP has been through in-person interaction or, alternately, conversing. Such proximal forms of communication limit the scope of the conventional CoP to the immediately surrounding geography (Jin, Wen, & Gough, 2010). However, Web 2.0 technologies offer novel ways of undertaking efficient communication despite vast geographical distances. Web 2.0 technologies confer the capability to drastically reshape the scale and scope of CoPs.

Web 2.0 offers increased collaboration speeds in the virtual, or online, realm, thus enhancing the functionality of CoPs. Web 2.0 allows users to transmit knowledge, research, data, and practical experience more easily (Lewis et al., 2010). The ubiquity of the Internet allows for interaction between experts from different areas of the globe. Expert-to-expert interaction enables communities to disseminate information more quickly and effectively. Another potential benefit of virtual CoPs is their ability to foster multiculturalism, thus expanding a community's diversity and versatility. Multicultural interaction creates a higher level of understanding and fosters an increase in social skills, and these communities exist in virtual realms because of the broad access that exists through online social networking (Hossain & Aydin, 2007). Observations and practices that are common in specific parts of the globe may become accessible worldwide when the communities become part of the virtual realm.

## 1.2 Opportunities and Costs – Considerations for Developing a Community of Practice

Etienne Wenger, who first articulated the concept, has touted specific advantages of CoPs. An organization can 1) build knowledge competencies, 2) improve efficiency and effectiveness, and 3) allow for the cross-fertilization of ideas, innovation, and solutions (Wenger, 2008). Practitioners within the CoP construct a specific language and method for their work, develop avenues for disseminating their knowledge to larger populations, and deliberately create a store of knowledge – usually catalogued digitally when referring to virtual CoPs – that persists when participants leave the CoP. The larger community derives benefit from each individual's contribution, but each individual also receives benefit from the community. CoPs are convenient vehicles for staying current with latest knowledge, forging partnerships, leveraging disparate knowledge, and creating an identity amongst practitioners (Wenger, 2008).

There are costs, however, which must be considered in any online collaborative project. No endeavor online is problem-free, and just as an organization encounters problems, glitches, and inefficiencies, there are also online collaborative practices that should be addressed. The most conspicuous issue is the most important: boundaries. Whenever a community is formed, a boundary is drawn. Entities and individuals must constantly reevaluate where that line is drawn to maximize effectiveness and inclusiveness. Human competitiveness, free-riding, social loafing, trust, and bounded rationality are user costs in any online collaborative practice (Matzat, 2010; Meyerson, Weick, & Kramer, 1996; Jarvenpaa & Leidner, 1999; Schoberth, Preece, & Heinzl, 2003). Trust is especially important in this area. Trust has design aspects related to a website's graphics, structure, and content, all of which collaborators expect to be credible, personalized, and predictable (Briggs et al., 2002; Wang & Emurian, 2005). Precisely because people are from varying organizations, there may be a tendency for competition, even on a subtle, unstated level. Therefore, it is important to establish a team environment, a consortium of actors and stakeholders. No one can manage individuals' contributions, but a cultivated environment of reciprocity and "conversation"—especially around a specified project—can maintain the CoP's momentum (Donath & Boyd, 2004; Lin & Lin, 2006).

Another consideration is the volume of information, the type of information, and an understanding of human limitations for information consumption. In short, "information overload" is a potential problem. From October 2007 to January 2008, the average amount of time users spent online social networking decreased by 14 percent. A study reported by Ante &

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Holahan (2008) suggested that the abundance and perceived over-extension of online advertising had discouraged some users from continuing their use of social networking. Furthermore, a practice known as gatekeeping – including "selection, addition, withholding, display, channeling, shaping, manipulation, repetition, timing, localization, integration, disregard, and deletion of information" – can be effectively managed, if organizers remain vigilant and keep online communities from moving in a hierarchical direction (Barzilai-Nahon, 2006). Monitoring information flow, how much information is shared at any given time, and the way in which it is shared are all concerns in a CoP.

1.3 Virtual Communities of Practice as a Learning Community

Learning communities are one of the primary applications of a CoP, and this use is particularly relevant for university systems. At the college level, students and professors can benefit from the inclusion of virtual CoPs in the postsecondary learning community. Certain aspects of Web 2.0 technologies, such as cross-cultural interactions and technology-enhanced learning, may increase students' educational success. Virtual CoPs also allow more students to participate in research or other "hands-on" applications of what they are learning. Web 2.0 may assist researchers in their collaborations. Experiential learning opportunities, such as student research programs, are an important benefit produced by CoPs at the postsecondary level. Not only does this professor-student relationship foster the knowledge dissemination within their own CoP, it creates a byproduct that is readily used by other communities. Within a virtual context, researchers are able to accomplish more. They benefit from less travel time, intensified feedback loops, and more readily available knowledge.

**2. Discussion - Applicability of Communities of Practice for University Systems**

Online CoPs may be useful for supporting the programmatic efforts of state-level university systems. Each program or project may be viewed as a self-contained community organized around a specific goal or focus (i.e. ostensibly, the mission of the program). Furthermore, each of these programs involves a set of stakeholders, constituents, and partners who already comprise a community that works toward these goals through communication and collaboration and sharing of knowledge and practices.

What an online community of practice accomplishes, then, is the formal identification of that community and support of it through a set of online tools and management. By providing a platform for instructors and institutions to communicate and share practices, educational systems will increase the effectiveness of curricula and supporting programs.

2.1 Virtual Communities of Practice within STEM Education

Within STEM practice and STEM education, there is a fundamental breakdown of bridging the gap between research and practice (Lewis et al., 2010). Virtual communities of practice have been observed to be particularly effective within the STEM disciplines, where historically; the divide between researchers and practitioners has been very separated (Lewis et al., 2010). Within the realms of Web 2.0 technologies, the ability for these two agents to collaborate and share their expertise and their research is uniquely unmatched (Wenger, 2002). One of the many challenges faced by researchers to be more involved within communities of

practice is their very restricted agendas (Lewis et al., 2010).  This makes personal collaboration difficult to manage.  Without this interpersonal communication, mutually beneficial research cannot be exchanged, and the research process is very much inhibited.  This particular barrier within the STEM research realm can be greatly reduced by the presence of Web 2.0 (Lewis et al., 2010).  The creation of fluid "social media" sites can be taken advantage of to connect researchers, teachers, students, and practitioners in ways that have been historically impossible (Wenger, 2002).

## 2.2 Case Study: USG STEM Initiative

Led by the University System of Georgia's (USG) Office of Educational Access and Success (OEAS), the USG STEM Initiative provides a specific case in point for the potential of a virtual CoP.  The USG STEM Initiative is a large-scale, longitudinal program led by that has involved a total of fourteen universities and colleges since 2007.  Given its wide scope and breadth of personnel, which includes a USG STEM coordinator, STEM coordinators/project directors at participating institutions, affiliated STEM faculty, and other key partners, a CoP may optimize the initiative's organization, operation, and collaboration.
The STEM Initiative involves a complex community consisting of several organizational layers. Here, we are focusing on the initiative's core; that is, those personnel with direct involvement with OEAS, including OEAS leadership and senior staff, USG STEM Coordinator, institutional STEM Coordinators, and key faculty.  Within this STEM Initiative community, these stakeholders would benefit tremendously from the ability to communicate and collaborate. Given scheduling conflicts, time constraints, and geographical constraints, the opportunity for these players to collaborate with each other is minimal.  By creating a platform, OEAS facilitates institutions in sharing research and findings with the USG STEM Coordinator, or allowing the STEM Coordinator to provide feedback to the concerned parties within an effective timeframe.

Given the multi-mission nature of OEAS, including its focus on supporting teacher training, facilitating college access and success, and overseeing programs for STEM, there is a distinct advantage in actively encouraging and facilitating the interaction of the stakeholders. The importance of the feedback loop between research and practice cannot be understated. STEM Initiative coordinators, affiliated faculty, researchers, and other constituents stand to become more effective if they are connected.

However, the initial investment in a virtual CoP may be costly.  The time that it takes to create an effective and secure web domain, recruit and register the appropriate stakeholders, train them in how to use the site, and finally put the site in to practice will consume time and resources.  OEAS will also be charged with maintaining the site and insuring its effectiveness. At the end of this paper, we provide some guidance for how such a process might be undertaken. While directly applicable for the USG STEM Initiative, other systems and their programs stand to benefit from these recommendations.

## 2.3 Virtual Communities of Practice in Educator Preparation

Within pedagogical communities of practice, one of the great barriers to their formation has been a lack of established, definitive best practices for teaching (Lewis et al., 2010).

Nevertheless, there remains a potential for sharing experience and knowledge. Collaboration between teachers, utilizing social media, may allow them to benefit from different perspectives, especially when interacting with colleagues from different systems or states. Yet, many teachers who are willing to share their practices and instruction methods still lack the ability to do so. Within the state of Ohio, there is a "Learning Lounge" that allows for teachers to post videos, create threads where other teachers can respond, and even post materials for students to have extra practice. This is a recent, simple representation of how virtual pedagogical communities of practice can reshape the teaching landscape. The design of the Ohio Learning Lounge is not as fluid as most social media sites, but it creates an information hub. This common ground for teachers to disseminate information and develop better pedagogical practices can be developed and refined to encourage information exchange.

Within pedagogical communities of practice, teachers are experiencing difficulty in providing enough practice for students to really understand materials (Lewis et al., 2010). Students who do not fully understand basic principles of mathematics, for example, face a significant barrier to postsecondary entry and success. Teachers need a medium, through which, they can give students individual attention to address specific educational needs (Lewis et al., 2010). The Khan Academy is an example of what can be produced through pedagogical communities of practice when they utilize a virtual workplace and a web-based medium. The Khan Academy starts with basic mathematics problems and slowly works the users up until they are completely advanced calculus problems. It is potential suitable for use by P-16 students. An advantage of the Khan Academy is how mathematics is broken down into a large number of subcategories. By breaking up lessons into small units and mapping how these categories are interconnected, students are able to identify and address specific problems they are having. For example, a student's difficulties in calculus may be traced back to specific deficiencies in geometry, which may help them to succeed once addressed. This site, or others like it, can be linked to a central hub site within the Georgia network to allow for students to have additional practice, identify problem areas, and to learn more advanced mathematics if their current math is not challenging enough.

2.4 Virtual Communities of Practice in Postsecondary Learning

Within the university level, virtual communities of practice offer potential benefits. Researchers have noted the existence of a gap between university education research and practice, offering two potential explanations for continued barriers (Lewis et al., 2010). First, there may be a belief that research is not directly applicable to the resulting practices. Second, there is a matter of limited sharing of and access to cutting-edge research, practices, and equipment (Lewis et al., 2010). Through web-based materials such as a wiki, listserv, or blog site, both of these barriers may be mitigated. By dispersing their research through the online site, university researchers can both see the impact of their research and see the works and articles produced by their peers (Lewis et al., 2010). What Web 2.0 offers to the university level research realm is a change in the directionality of information exchange and the structure of the information authority (Lewis et al., 2010). By redirecting the authority away from the researcher and by allowing a direct feedback loop from the practitioner, expertise becomes shared, and future research becomes more directed and effective (Lewis et al., 2010). By creating a medium for the feedback loop, and fostering the communication between the researcher and the

practitioner, information dispersion becomes multi-directional (Lewis et al., 2010). Historically, the information would come from the researcher all at once, and then the feedback would come back all at once. Web 2.0 may allow for the feedback and information to be continual but also manageable, further helping to make the research more directed and effective (Lewis et al., 2010).

## 3. Platforms for Virtual, Online Communities of Practice

A number of exemplar platforms exist regarding the development of virtual communities of practice. Of chief concern are the ideas of knowledge sharing and increased communication. By utilizing different tools made possible by Web 2.0 technologies, CoPs can exist, and thrive, in the virtual realm.

*Wikis*

Wikipedia demonstrates the vast potential of harnessing the collective knowledge of different communities. Without the interaction of different people groups and communities, the amount of knowledge shared through Wikipedia would be impossible. In a single Wikipedia entry, readers may observe years of knowledge and experiential application that has been compounded by a CoP and made possible through online wikis. The ability of Web 2.0 to store and recall large amounts of data enhances the ability of a community to share the expert knowledge to those in their novice state (Gammelgard, 2008). Knowledge stored on Wikipedia is freely editable if you have a login, but editors are held responsible to the other members of their community. The pages on Wikipedia demonstrate one aspect of CoP interaction— dispersion of knowledge.

*Facebook/Google +*

Another important element of CoPs is the social aspect in terms of community formation and professional collegiality among members (Jin, Wen, & Gough, 2010). Refined social networking platforms allow for connection and relationship building to occur despite long distances or lack of face time (Jin, Wen, & Gough, 2010). Social connection fosters the intake of knowledge within CoPs, and the relational time is very important to deeper understanding of material (Lenox & Coleman, 2010). Social networking lacks the massive amounts of raw data that is available through sites such as Wikipedia, but provides the professional relationship building that is not offered through online encyclopedias. Social networking sites more completely represent the ideals behind a CoP, and have a large potential to change the way in which communities interact with each other.

## 4. Developing Virtual Communities of Practice

*Educator Preparation*

The scholarly literature suggests that pre-service and new teachers are most confident in their ability to teach effectively when they have large amounts of interaction with veteran teachers (Chou, 2011). Often, established communities of practice can be difficult to enter, and

novice teachers can benefit from the expertise offered by experienced educators. However good an educator preparation program may be, interactions with practicing educators will be more beneficial to teachers in the beginning of their careers (Chou, 2011). In a broader context, the development of a site that aspires to connect teachers with peers teaching their same subject offers a gateway to the dissemination of best practices. The need for new teachers to have more exposure to the education world is well documented, and the incorporation of a site designed to develop a stronger community among teachers will greatly benefit school systems. Nothing will prepare teachers better for the career field they are stepping in to than the expertise of someone who has been in that field longer.

4.1 Deployment of Virtual Communities of Practice

In deploying a community of practice, it is of importance to develop the platform first. This platform must be secure, easily maintained, and easily used. Examples of this platform include Microsoft SharePoint. The benefit of this technology is its adaptability and in-house understanding. The "sandbox" nature of the platform allows its customization to specifically fit the need of the community. After the construction of the site, it is imperative to be as proactive as possible to establish communication ties and interest with the key players. The burden on their schedule should be minimal, but their inclusion in the site, in a timely manner, is important. Lastly, their ability to register and understand the site needs to be a high priority, so the team dedicated to the site must be readily available early in the process.

4.2 Barriers to Deployment

The nature of the players targeted for the platform will mean the time necessary to recruit and instruct the users will be high. The platform will aim to create an avenue for their communication because of their full schedules, but they cannot be registered and instructed without giving up time in their schedule. The development of the site and an in-house team will be time consuming. The site will have to be managed by a central organizational entity and the in house support team will have to be readily available should problems arise.

**5. Conclusion and Recommendations**

The creation and management of an education-specific virtual CoP has the potential to improve various education programs. The aims of this virtual platform will be to provide a centralized "location" in the organization for the sharing of knowledge regarding the educational program. This knowledge will consist of new pedagogical practices, education related funding opportunities, research data, system communications, and program specific collaboration. CACP proposes the creation of a multimedia, social platform to increase collaboration between all actors with a vested interest in the specific program. The site will aim to centralize communication between the program coordinator, third party analyzers, and policy makers. The expected outcomes of this opportunity would be an increase in more effective communication lanes between the system and local program coordinators, and a centralized location for information regarding the university system and related projects.

**Recommended steps for insuring expedited platform production while insuring website utility, development flexibility, and feedback integrity:**

1. Develop a planning committee for the virtual platform
2. Identify the education system's primary goals for the platform
3. Develop an in-house production team to insure expedited production
4. Create a "beta" version of the website
5. Evaluate the website's effectiveness in addressing the primary goals
6. Identify Key Players to insure website utility
7. Recruit and Register Key Players
8. Educate and Train Key Players
9. Seek feedback from new users
10. Tailor website based on feedback
11. Charge Key Players with recruiting Key Faculty
12. Register Key Faculty
13. Key Players Educate and Train Key Faculty
14.  Seek feedback from new users
15. Make final tweaks to the "beta" site
16. "Launch" website
17. Convert production team to management team
18. Schedule regular meetings between management team and the university system
19. Continually monitor feedback
20. Identify other "communities" that would benefit from virtual platform
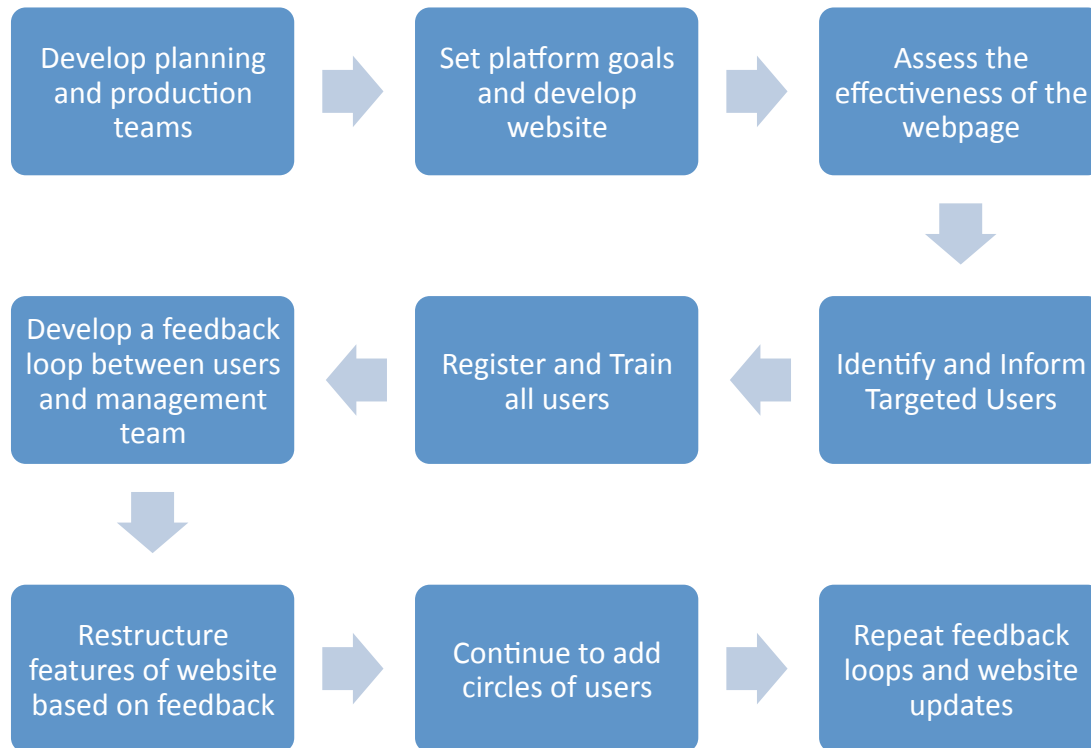
**Develop a Planning Committee**

A planning committee should exist that consists of key leadership and senior staff within the education system. Also of note are personnel with a vested interest in the various programs and willing to serve as the center point of the virtual platform.

**Identify Primary goals of the platform**

The goals of the platform should be to create a network of key players in the various programs, establish communication lanes between them, and aid in their dispersal of knowledge.
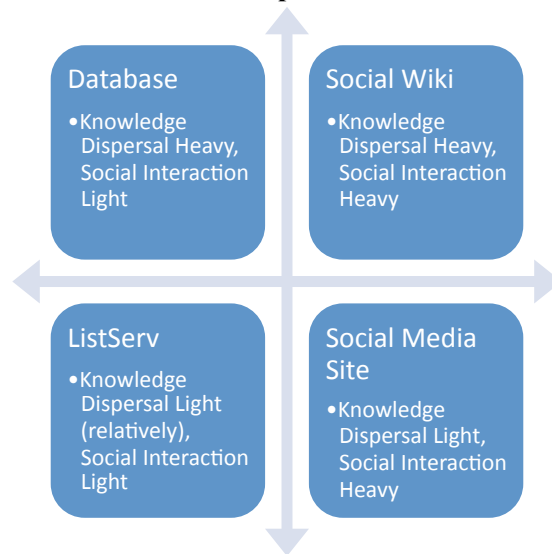
**Develop Production Team**

The production team will work alongside of the planning committee to create the actual site. The production team needs to be in house, and familiar with the software they are using. Communication with the website designers will enable the website to be adapted quickly should any problems or new ideas arise.

**Create "Beta" Version of the Website**

The production team should then be charged with the construction of the website. This website will not be a finished product, and therefore can be considered a "Beta" version. It is important that the production team be familiar with the software, making Microsoft SharePoint a leading candidate for the platform. The "sandbox" feel of Microsoft SharePoint lends itself to a

higher customization factor than other programs, and can be run by an in-house team.  Another option for the base platform would be a Google Group.  Running a Google Group would reduce the amount of control the in-house team would have, but it would also reduce the production time, and allow for more customization.

**Graphical Representation of Website Options**

| Database | Social Wiki |
|---|---|
| •Knowledge Dispersal Heavy, Social Interaction Light | •Knowledge Dispersal Heavy, Social Interaction Heavy |
| ListServ | Social Media Site |
| •Knowledge Dispersal Light (relatively), Social Interaction Light | •Knowledge Dispersal Light, Social Interaction Heavy |

**Evaluate the Effectiveness**

The planning committee will need to evaluate the website's effectiveness in reaching the goals they previously determined.  This should be a short trial period, in which the planning committee will use the platform as if it were a live site.  Updates should be made to the website if the planning committee determines goals can be addressed more effectively.  The definition of "effective" and its application to the goals will need to be determined by the planning committee prior to the trial run

**Identify Key Players**

These players are those outside of the university system that play a major role in the various programs.  Other players may include actors in policy, funding, political, or media fields.

**Recruit and Register Key Players**

After the identification of players for the site, it becomes the duty of the planning committee to extend an invitation to be part of the site.  After recruiting the players, it becomes the duty of the production team to register, or create accounts, for each of these new members.

**Educate and Train Key Players**

This can be particularly difficult because of the time restraints on most players involved in this platform.  A large justification of the site is to allow communication on one's own terms,

thus avoiding scheduling conflicts.  For this reason, the production team should create a tutorial or instructional video that is embedded in the site.  This will allow players to learn at their own speed, and whenever is most convenient.

**Seek Feedback from Users**

The planning committee should set a time period and seek the feedback of the new users after that time is up.  This can be in the form of emails, phone calls, or even a forum on the site itself.

**Update Website Based on Feedback**

The planning committee will need to sift through the feedback they receive and identify potential updates to the platform.  If they find any reasonable recommendations, these should be relayed to the production team and updated to the website.

**Key Players Recruit Key Users**

Key players will need to create the third circle of the platform by recruiting key users or personnel within their department.  They will need to relay the identities of the users to the production team.

**Register Key Users**

The production team will need to create accounts for the new users.

**Educate and Train Key Users**

This will mirror the previous step, and the same instructional method should be used.

**Seek feedback from All Users**

Enable the new users to give their feedback of the site.  This will be the final "round" of feedback before the website is launched.

**Update Platform Based on Feedback**

The production team will update the website with any new recommendations from the planning committee.

**"Launch" Website**

Make the site accessible to the target audience.  It could stay at a certain designated level, or it could be used as more accessible broader resource.  Not everyone should be registered to use the site, but a place in which practitioners can share their knowledge will greatly benefit the programmatic initiatives.

**Convert Production Team to Management Team**

The "production" of the website is over, but in-house control remains of high importance.

**Schedule regular meetings between Management Team and University System**

Insure that the planning committee and the management team have a regular lane of communication.

**Continually Monitor Feedback**

Allow for users to generate feedback for the website. The management team should design a way for users to communicate back to them.

**Identify Systems That Could Benefit From Platform**

The planning committee should also begin to identify other programs within the system that can benefit from the adoption of a social media platform.

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