American Journal of Educational Research, 2015, Vol. 3, No. 10, 1330-1336
Available online at http://pubs.sciepub.com/education/3/10/20

DOI:10.12691/education-3-10-20

Opportunities and Lessons from Informal and Non-formal Learning: Applications to Online Environments

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Abstract Learners are more and more exposed to various forms of interaction outside of traditional brick and mortar classrooms. It is important to understand the different ways and contexts learners can interact with one another. An important distinction in the literature is the differences between formal, non-formal, and informal learning. Furthermore, in the online space, different types of modalities affect the way in which learners can best take advantage of interaction opportunities in online educational settings, and what types of extracurricular modalities will benefit them the most. This paper will discuss these distinctions among formal, non-formal and informal education as they relate to learner to learner interaction online, and promulgate a seven point framework for best environments for varied learning situations online.

Keywords: *learner to learner interaction, informal, non-formal, online learning, SNS, learning systems*

Cite This Article: Christopher Lange, and Jamie Costley, "Opportunities and Lessons from Informal and Non-formal Learning: Applications to Online Environments." *American Journal of Educational Research*, vol. 3, no. 10 (2015): 1330-1336. doi: 10.12691/education-3-10-20.

1. Introduction

In the use of computers and the Internet to promote teaching and learning, there have been key developments in the last decades that have direct implications for the implementation of online modalities in the classroom. First, there has been a significant increase in the use of online components in university courses [21] in general, and forms of student to student interaction in particular. Ubiquitous use of this technology is relatively new and its application has not always been optimized [21]. An understanding of how institutions should apply online learning modalities to the classroom is necessary and how the many different potential learner to learner interactions can be best managed and promoted is important. The tightening of higher education budgets around the world [18] makes it all the more important that we can best optimize already limited resources. Using non-traditional forms of delivering information and creating spaces for learner to learner interaction outside of expensive face to face modalities is an effective method to reduce costs. It is a challenge to understand and operate in this new learning environment, and a framework that helps to understand more effective non-formal or informal learner to learner interaction allows greater flexibility for higher learning institutions to create meaningful interactive learning situations for their students.

While traditional views of school and schooling still dominate our understanding of education, since the turn of the 21st century, more and more people have been learning from nontraditional sources. The advent and ubiquity of the Internet as a source of knowledge and learning has been at the root of this change. With fast connections, mobile devices, and web 2.0, both distributors and receivers of knowledge and information can interact with ease and at a great depth of connection. As varieties and types of learning have proliferated and coalesced with the adoption of multiple media consumption by individuals and the ease and opportunities provided by the Internet, informal learning has become a more important factor in education practice and theory. While it may seem incoherent to provide a formal explanation for something "informal", it is necessary at the outset to provide a basic framework that describes the differences between the main two constructs that overarch this research. Definitions of formal and informal learning abound in the literature [4,7,13,34,35,45,46], and precise distinctions often feel awkward or clunky. When attempting to distinguish informal learning from formal learning Ebner, Lienhardt, Rohs and Meyer [17] emphasize the lack of definitional clarity by stating, "Despite, or even due to the mass of publications about informal learning, the term is being absorbed into different pedagogical contexts and is becoming more and more unclear".

2. Methodology

2.1. Formal and Informal Learning

Regardless of the inconsistencies, many researchers in the field define formal learning as highly structured,

institutionally sponsored learning that takes place in educational environments designed to support learning, specifically schools, colleges and universities [4,23,34,35,45]. Informal learning is often defined as being learning that is not professionally organized or highly structured and occurs outside of the formal learning framework (although not necessarily outside the physical space of educational institutions) through everyday activities in settings such as the workplace, local communities, family environments, online environments, online communities, student organizations, study groups, etc [4,35,45].

Formal learning and informal learning contrast with each other in a number of ways. The obvious distinction between the two is evident in their contextual settings. While formal learning is highly structured, institutionally sponsored and takes place in traditional educational environments (schools, colleges, and universities), informal learning occurs outside of this context and can happen virtually anywhere [45]. Looking deeper into these different contextual settings provides a clearer picture. Formal learning is designed to be more structured, which gives students, instructors, and institutions direction to ensure learning objectives are being met [14]. Specific pedagogies and materials to facilitate the education process are generally provided in formal learning contexts [34]. Within formal learning situations, students tend be extrinsically motivated through avenues such as advancing to the next level, obtaining certification, or obtaining promising career opportunities [45]. Within informal learning, objectives and processes are solely in the hands of the learners, who tend to be self-directed and generally motivated by their own interest and a will to obtain knowledge in a specific area [17]. They control their own knowledge acquisition, and a lack of prescribed objectives precludes systematic pedagogical intervention. The defining characteristics of formal and informal learning are listed below.

Table 1. Characteristics of formal and informal learning

Formal learning	*Informal learning*
Occurs within an institutionalized framework [13,46]	Outside the curricula and the intended goals of educational institutions [45]
Is a hierarchal system with ministries of education at the top and students at the bottom [45]	Multiple systems of organization including workplace, family, social organization, where the student can be situated anywhere on the hierarchy [32,35].
Often has prescribed curriculum designed by the state or by the institution [45]	No learning objectives specified, learners can decide what systems or materials they interact with [34].
Preparatory in the sense that the learning taking place prepares the students for the next level, often with certification for specific levels [45].	No prescribed sequence of learning events or certification [45].
Has compulsory component with time restrictions on completing pedagogical units [34,45]	Voluntary/self-directed/non-compulsory [7,35]
Teaching and learning situations are structured around objectives and assessment [34].	Lacks inherent structure and assessment [35]
Institution sets the routine and learners must adapt to it [45]	Integrated with daily routines and individual requirements of the learners [35].

2.2. Non-formal Learning

Within a gray area between informal and formal learning lies “non-formal learning”. The need for this category is apparent through the existence of programs designed for learning outside of the educational institution framework. Although learners participate in these programs outside of an educational institution setting, researchers have deemed them too “formal” to be included in the realm of informal learning [19,40]. Non-formal learning contains some of the same aspects of formal learning, but typically manifest as short term, voluntary programs outside of the framework of traditional educational institutions [45]. The similarities between the two often include the presence of a professional instructor facilitating students who follow a planned curriculum [45]. Additionally, as with formal learning, non-formal learning environments may contain objectives with assessment based on the ability to achieve those objectives [40]. Also, non-formal learning differs from formal learning in that it does not heavily rely on the establishment of prerequisites for entry into a course, and the courses are typically not compulsory [40,45]. Non-formal learning is offered by a wide variety of organizations, including government services, youth organizations, training services, scientific unions, enterprises, voluntary and nonprofit organizations [4]. Recently, there has been a rise in these organizations allowing their materials to be accessible online. These courses are offered for students who are interested in expanding their knowledge in a specific area and online courses or information allow learners to access material of interest to them anytime in any format in which they desire. Examples of these non-formal online learning environments include massive open online courses such as Khan Academy, edX, Udacity and Coursera. Recently, formal learning institutions such as universities have formed an association with some non-formal learning programs to provide partial credit for the coursework completed in the online courses, further blurring the line between formal and non-formal learning [54].

Non-formal education therefore, is a useful and important part of education as a whole, and can provide learners with a great deal of opportunity outside subjects they would not normally study or as a supplement to formal learning. While it is generally true that “more is better” when it comes to acquiring skills or knowledge in a particular area, and students who use resources outside of class will tend to do better than those who use only institution provided materials, not all informal or non-formal spaces are created equal. Some areas of student to student interaction can provide a great deal of social development and are great sources of knowledge about a wide variety of topics. However, some online spaces, even those that look to be educational, can be little more than a distraction for students looking to further their understanding of materials from their class, or just gather more information on a particular topic.

2.3. Learner-to-Learner Interaction

The importance of interaction with others is an important aspect of effective education [41,42]. The knowledge gained from interaction with others has long term cognitive effects, as the knowledge becomes more effectively integrated into the cognitive structure of the learner through interaction. Therefore, the more interaction between learners that occurs within a specific learning situation, the more beneficial it is to learning and the acquisition of knowledge. More specifically, interaction between learners in a community may promote higher levels of critical thinking and higher order thinking [22]. The benefits of learning within a community are numerous and research has shown that it is beneficial in the sense that within a community of learners, knowledge is constructed through the sharing of information and negotiation of meaning. Akyol and Garrison [1] support this by showing the presence of higher levels of cognition when learners engage in collaborative tasks within communities of learning. When no collaboration is required, learners tend not to develop high levels of critical thinking, while learners who are encouraged to collaborate with each other show higher levels of critical thinking [11]. Both of these studies support the idea of learner-to-learner collaboration being a gateway to critical thinking.

The Internet serves as a useful platform to promote learning through interaction, and ultimately critical thinking within a community of learners. Research has shown that it is useful in the social construction of knowledge through interactive online discussion [52]. Users within online courses, social network services, asynchronous online forums, instant messaging services, and synchronous online conferencing are able to interact within their respective groups and negotiate the meaning of socially constructed ideas through the exchange of feedback based on those ideas. Therefore, online interaction provides an opportunity for learners to have responsibility and control over their learning through learner to learner interaction. The benefits of participating in learner to learner interaction within a community is magnified with the use of the Internet through its ease of use, wide accessibility, and its use of specific platforms that attract users with common learning interests. Understanding a general framework of these platforms and the ways in which learners use them can provide a more comprehensive view of how informal and non-formal learning are applied to online environments. The following are the characteristics of potentially effective online informal/non-formal education technologies.

2.4. MOOCs

Within the non-formal learning sphere, massive open online courses (MOOCs) have served as potentially effective forms of online technology when it comes to supporting learning. Unlike informal learning, the educational advantages are more easily perceived because they closely mirror aspects of formal education. Similar to formal education settings, MOOCs generally utilize the services of an instructional expert to facilitate the process of learning to a group of students. Online resources and materials used in MOOCs replace the textbook in a formal learning setting, but are designed to serve the same purpose [53]. Unlike formal learning settings however, they typically have no prerequisites, formal accreditation, or compulsory participation [36]. The following characteristics represent the potential for MOOCs to be an effective form of non-formal online learning. 1) A group of users enrolled in educational courses who otherwise would not pursue education in a formal learning setting. MOOCs exist in online environments open to virtually anyone who wants to participate. They were initially designed to be free of charge with no prerequisites as part of course registration [44]. It differs from those forms of informal learning in that it is designed to have a more educational approach. MOOC participants benefit from the pedagogical approach taken by these courses online and those who cannot afford or are not yet willing to commit to formal education reap these benefits. 2) A group of users motivated to enhance their knowledge in a specific subject matter. Not all MOOC users participate in them to obtain a more formal style education within a non-formal environment. Some learners seek out specific MOOCs in order to broaden their knowledge in a specific field and do so out of interest and pursuit of lifelong learning [6]. Overall, MOOCs serve as an effective form of educational technology in that they are able to reach a wide group of learners. However the issue of participation within these online courses needs to be addressed as the completion rate among its users is under 10 percent [33]. More needs to be done to ensure the success of MOOCs, but the potential is there to provide a meaningful learning experience to online learners.

2.5. Social Networking Services

Social networking services (SNS) provide a practical environment for learning where users can collaborate by establishing and maintaining connections with other users [30]. Commonly viewed as informal learning sites, SNS have allowed users to connect to each other and take advantage of not only acquiring knowledge informally, but also supplementing what can be learned formally [5]. The use of SNS alone does not guarantee effective learning, but rather they provide an environment where effective learning can take place. A base of users processing and disseminating information in a rapid manner helps make an SNS an effective learning environment. Because of the ease of use and instant accessibility of SNS sites on mobile devices, information is sent and received quickly, allowing the user to access and process the information in a moment's notice. Stutzman [48] sums it up by stating "In an instant information is revealed, opportunities are discovered." This effectively allows the user to absorb the information and disseminate potentially useful information to other users instantaneously. SNS sites also encourage engagement with users who post information that they do not agree with [7]. This characteristic has pedagogical implications in that questioning and disagreeing with information presented by a fellow learner allows one to think more critically [12]. Critical thinking has been proven to be beneficial in the acquisition of knowledge, and SMS provide an environment that can ultimately encourage critical thinking. Furthermore, many SNS sites have users who are motivated to share information with a wide audience. Participation has been shown to be

beneficial when it comes to the acquisition and construction of knowledge [43]. Learners are motivated to participate in a number of ways. Learners who use SMS realize that they have the power to potentially reach a global audience and therefore are more willing to share specific information [7]. For many users, this can serve as motivation to participate in a way where many people can take part in the information sharing process.

2.6. Asynchronous Forums

There have been many technologies that have emerged naturally from the Internet. Internet forums have been one of them. They span every subject or field that one wants to interact or exchange views on. Internet forums are asynchronous in nature, which allows users to interact and make posts at their own pace. This time component along with anonymity has important implications in that users are under little pressure to post or make contributions. Learners prefer contributing to a forum over other methods of interacting with other students [8,39,49,51]. For this reason and their ease of use, educational institutions have begun to use asynchronous Internet forums both formally, informally and non-formally. Universities in particular, looking for a method for their growing number of blended or online learners to interact, have been quick to integrate forum use into their programs. Forums give university students an opportunity to ask questions, discuss issues, and observe how their peers are interacting within the content of their classes or extra-curricular activities. More specifically, for some university courses, posting and interacting on an online forum has been included as part of a student's final grade for that course [2].

Using forums to facilitate online learning is a core tool in the application of CMC in education [25]. Forums are used in three importantly separate ways: 1) The only way learners interact, 2) One method, along with other online methods for learners to interact, and 3) A method along with offline lessons for learners to interact. While these three uses have different applications and requirements for effective integration into a course, they share the feature of being an efficient and useful way to develop and facilitate learner to learner collaboration and cooperation [25]. Another important characteristic of online forums that makes them an excellent tool for educational purposes is that it has been shown that asynchronous forums posts have been shown to be higher quality (discourse was more sustained, well thought out and less superficial) than contributions from face to face interactions in class [24]. Furthermore, asynchronous forums require learners to interact in a written form, which, in and of itself encourages reflection on learning contents and their own beliefs. [26]. More specifically, asynchronous forums allow learners the opportunity to interact in a way that leads to a more developed level of cognitive presence in their interactions.

2.7. Instant Messenger

Though use of forums as part of a learner's education has somewhat mirrored their use outside of educational settings, other technologies haven't found such a comfortable spot in educational settings. One of these technologies is the now widespread use of instant messenger technology (IM). It was shown in 2007 that college age students spent 20 minutes a day actively engaged in using IM, and one supposes that usage has only increased [10]. Furthermore, college age students have been shown to prefer interacting with peers using IM over other online modalities [9]. While it is true that many educationalists promote interaction among learners as positive, there is limited evidence to support the use of IM as being a positive on student learning [28]. More specifically, while interaction through IM can be positive for learners, distraction in the form of multitasking can lead to lower quality classwork and some students not completing assignments [28]. This aside, one of the great benefits of IM is its ability to recreate a common space for natural learner interaction and a much stronger learning community [38]. In the past, IM services like ICQ ran on users' computers and could be used while users use other programs. This allowed a great deal of interactivity and real-time interaction while the user was at his computer. The existence of these programs on smart phones has increased the ubiquity of user to user interaction over this medium. IM messenger services have been shown to be an effective method of promoting casual, social interactions that allow a freer, smoother communicative process [37].

2.8. Synchronous Communication

Synchronous communication as part of CMC offers users the chance to communicate and exchange ideas in real time without any interruption to the communication. Platforms that allow for this type of communication include Blackboard Collaborate, Adobe Connect, WebEx, and Skype. These platforms also serve as a useful tool for learning as it allows for learner to learner interaction in a synchronous manner. Synchronous learning not only contains many of the same benefits as face to face learning, but also allows communication to occur between learners who are physically separated by distances outside of the classroom.

Current uses of this type of communication have already enhanced the learner to learner experience within CMC, and there is potential for growth as more and more teaching and learning adopts synchronous online interaction as a method of interaction. Video conferencing for example, can be effectively applied within a constructivist framework, allowing students to construct knowledge through interaction that replicates a brick and mortar classroom. The conferencing technology itself is not responsible for the creation of the pedagogical approach, but it allows support in a manner in which learners can share information and construct knowledge in a real time setting, regardless of physical barriers [47]. Smyth [47] proposes a framework where learners, knowledge, and connectivity are all interrelated within the learning experience. Computer conferencing fits into this model as a form of connectivity that allows learners to communicate and construct knowledge in a synchronous fashion.

3. Results and Conclusion

3.1. Characteristics of Effective Non-formal /Informal Learning Environments

While some online environments languish in entertaining but vacuous interactions, others provide

meaningful places where users can gain a deeper understanding about topics of interest to them. The following are 7 characteristics of informal discussion forums that allow them to fully realize their potential as learning spaces: 1) A base of knowledgeable users on the topic of the forum. 2) Users who have gaps in their knowledge of the topic of the forum. 3) Knowledgeable users prepared to share their knowledge. 4) Regular questioning regarding gaps in some users' knowledge. 5) Users with knowledge gaps who assess and listen to answers given. 6) Praise for useful contributions. 7) Criticism for poor contributions. Maximization of these 7 characteristics of a forum will create an informal/non-formal environment suitable for learning.

For interaction between people to lead to learning, there must be two kinds of people involved in the interaction. First, there must be individual(s) who have some degree of experience or familiarity with the topic of discussion. Those learners are necessary because without them learner to learner interactions will become a case of the blind leading the blind. On the other hand, it is also important that there are learners who lack knowledge in the areas in which other learners are experienced in. These learners will gain from the more experienced learners' knowledge, while the experiences learners will be able to make their own knowledge more concrete through the process of explaining things to the less experienced learners. Research supports the importance of creating an online learning environment consisting of both knowledgeable users and users with gaps in their knowledge of the topic. Alomyan [3] has shown that users with prior knowledge have the ability to process and contribute to higher levels of information without experiencing cognitive overload. Conversely, Last, O'Donnell, and Kelly [31] report that less knowledgeable users in online learning struggle with information acquisition, often becoming disoriented and experiencing cognitive overload. Alomyan [3] postulate that this is due to their unfamiliarity of the subject matter, claiming that the solution in bridging the gaps between the two types of users becomes evident through the sharing of information through interaction between users.

While it is the case that experienced learners must want and be prepared to share their knowledge and experience with less experienced learners, less experienced learners also need to regularly question more experienced learners to address gaps in their knowledge. This can be accomplished through the use of elicitation, which is defined in terms of the learning process, as using fellow learners as resources through the use of questioning. [16]. Elicitation occurring within a community of learners has significant benefits in the learning process and has been shown to lead to more successful group learning [29]. Interaction like this is not only helpful to those who need the information, but sharing of the information by the more experienced users is useful for them in that it can help them make more sense of what they already know. Also, it can help the experienced user obtain useful information from another perspective through interacting with another user, regardless of that user's experience. From the less experienced users' point of view, it is important for them to address gaps in their knowledge by listening to and assessing the answers given to them by the more experienced users. Without doing this, effective interaction cannot occur between the users as information would be disregarded and not processed in a way that is productive for learning. This kind of information sharing in an online community of users is effective because communities of learners online go through specific phases which can promote learning One phase in particular, when users need clarity on the topic being discussed, is the *knowledge sharing phase* where learners can ask questions and elaborate on ideas regarding the topic. The majority of knowledge construction takes place in the sharing phase, showing the importance and justification of this practice of promoting user to user interaction [15].

Along with differing levels of learner knowledge and attitudes towards giving and receiving information being critical in developing an effective environment for learner-to-learner interaction, how learners praise or scorn contributions based on their quality will cause a non-formal learning environment to be more or less effective. It has been shown that praise for contributions to discourse will tend to promote that kind of discourse [20]. This can apply to not only contributions in the form of giving knowledge, but also the quality of questioning by less knowledgeable users. Furthermore, if users of a non-formal learning environment are criticized for poor or inaccurate contributions or questions, they may be less likely to make low quality contributions. Although criticism can be an effective form of feedback, Topping [50] suggests giving a certain level of praise to learners before giving criticism to avoid negative feelings such as anxiety from receiving such negative feedback. Regardless of its form (praise or criticism), peer to peer feedback within an online community of learners has proven benefits. Ertmer, et.al [20] for example, have shown that students believe that feedback reinforces learning and helps to achieve a higher understanding within the online community of learners.

4. Conclusion

Recognizing how learning effectively takes place within an informal/non-formal setting is useful when it comes to encouraging students to interact with each other within computer mediated communication. More and more users are turning to CMC as an alternative to formal learning. Informal and non-formal learning environments allow users to access an incredible amount of information and share that information with other users. Instructors need to recognize the differences between formal, non-formal, and informal learning to fully benefit from the use of informal and non-formal learning as a supplement to formal learning. Focusing on informal online learning, Bull, et. al [7] reflect this need by stating that, "informal learning experiences outside school offer a potential bridge between social media and academic content". Much more research needs to be done to find ways in which the gap between formal and informal learning can actually be bridged. This is not a simple task, particularly taking in to account the overlapping attributes applied by those seeking to define the two forms of learning. Making clear distinctions between the definitional differences is the first step to bridging the gap, but ultimately instructors need to use their knowledge about the differences as a foundation to encourage their students to take part in informal learning environments that can enhance their

formal learning experience. This encouragement can lead to a form of personal fusion of informal and formal learning by the learner. This is reflected in the following quote by Hall [23]: "This personal fusion is supported by trusted peers or practitioners and enables users to seek out appropriate personal connections between spaces, so that signals can be passed between networks, to inform action."

In regards to this personal fusion, there are several avenues learners can take within the informal and non-formal sphere. These modes of interaction are helpful for the student in the acquisition of knowledge and serve as supplements to formal learning that students may already be involved in. Various non-formal and informal alternatives to formal learning include online courses, SNS, instant messaging, synchronous communications such as web-conferencing, and asynchronous online forums. Users of these alternative forms of learning need to be able to use them in an effective way to ensure that learning occurs. Specifically, more experienced users need to be willing to interact with less experienced users in a way in which the gaps of knowledge are addressed. Exchanging ideas, giving feedback, and listening and assessing feedback all serve as a way for users to ensure effective learning in online environments. Prior research provides pedagogical support for this framework, which justifies its use as an effective way of assessing the effectiveness of specific informal and non-formal online environments [3,15,16,20,29,31,50]. Informal and non-formal online learning environments, therefore, if used effectively by the learners, have great potential as an alternative to formal learning.

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