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Technology-Embraced Informal-*in*-Formal-Learning

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Abstract. A characteristic of informal learning is that a person has an unsolved issue and starts searching for answers. To what extent can we transfer such a 'motivation to learn' into formal education? In 2002, an online, open, free forum at a university has been launched for around 2,000 students at a study program (CS). Users got the opportunity to co-construct new knowledge about issues what they want (e.g., course content, how to study successfully). Designed in that way, the online forum provides an informal learning space. Studying it from a sociological theory of social roles, one conclusion is that the iForum activates the conative level of learning. The term conation by K. Kolbe in 1990 refers to a concrete action; the learner does not only know, s/he really acts, s/he is willing to do sth. This rubric of learning is neglected in *designs for* formal schooling where cognitive learning 'textbook knowledge' is more focused.

Keywords. Conative learning, Online Forum, Role theory

1 Informal learning, unplanned learning

Informal learning usually takes place when a learner has unsolved issues outside of a formal instruction given by a teacher. Sometimes these informal unsolved issues are clear problems and conscious to an individual; sometimes they are less clear and less obvious. Imagine, a person who wants to know something and starts searching for an answer; planned informal learning. Such 'unsolved problems' are, for instance, improving a swim style by watching YouTube videos, checking information, observing keynote speakers, discussing newspaper articles. When facts are discussed offline at least one person takes her smartphone and 'googles' the information – unplanned informal learning takes place. Such forms of informal learning can lead to a deeper understanding and a different quality of a learning outcome; it enables the learner to expand her thinking beyond a receptive behavior at formal schooling and beyond a traditional reproduction of existing knowledge. A combination of both informal learning added to formal education might be a win-win situation for learners.

The research question is: To what extent, how, can formal schooling create structures and spaces to foster informal learning; for what purposes is informal-*in*-formal learning meaningful? To answer this question, an online forum for a computer science

study program has been analyzed. The research aim is to deepen the knowledge about student's behavior in an online forum that represents Technology-Enhanced informal-*in*-formal-learning, to understand the students' motivations and expectations.

2 Designing for linking informal and formal learning

Informal learning can be described by the concepts of "incidental learning" [14] and "experiential learning" by D. Kolb [11]. A person is doing Kolb's four learning steps by contrasting her experiences with the experiences of others [3]. Sometimes, these forms are unplanned learning situations that also occur in formal or non-formal learning situations. Formal, non-formal, informal learning differs in a) the degree of organization b) formal certificates, c) the criterion of 'who triggers learning' [1]:

- Formal learning is triggered by an instructor or teacher, organized by such a person or educational institution, the learner get credits or a formal degree;
- Non-formal learning is also a form of planned learning, and structured with regard to learning objectives, time, support; it is organized by an external person, but it usually takes place outside of educational institutions (e.g. community programs);
- Informal learning is a self-directed learning situation, or not-organized at all, triggered by the learner instead by an external teacher, no degree included.

A difference between the learning forms is the external organizer. Formal and non-formal learning is related to a teacher and tutor, who give instructions and rules; informal learning is related to an inspiring environment, reflections by the learner and supporting structures [15]. Supporting structures can be created through an online forum; learning through peer-reflection. Online forums, blogs using comments by readers, Facebook and LinkedIn groups are just few examples where informal learning can take place; detailed information is online in Jahnke [6].

Context of the study and description of mixed methods

In 2002, an online forum at a Computer Science faculty has been launched [9]. The free and open online forum has been offered to support students in doing their studies. The forum works as an informal learning approach in which learning is defined as the co-construction of knowledge among new and senior students, study advisors as well as faculty members [4]. The forum covers two fields, sub-forums for a) teaching like lectures, seminars, and b) planning and organizing the study from the students' perspectives. The forum is called iForum (InPUD). The data collection, analysis and redesign were conducted in iterative cycles of research and development from 2002 to 2009. The data gathering included mixed methods like open-ended interviews, standardized questionnaires, user statistics, content analysis and log-files.

The advanced role theory as a framework for studying the iForum

Our theoretical underpinning is the expansion of the role theory in sociotechnical systems; read [5] where we describe the term "role" and its long tradition. To make it short here, the two paradigms "symbolic interaction" (Mead 1934) and the "functionalistic perspective" (Linton 1936), elaborated by many others to the mid of the 1990s, attempt to explain the relationship between the individual and society, between a per-

son and the system. The functionalistic approach suggests the existence of objective structures made by the society that determine the individuals' behavior. In contrast, the symbolic interaction approach emphasizes that roles are formed more on the subjective will by actors. Both influence each other ([5], [10], [8]):

Social actors <-> Situated in co-constructed Roles <-> On-/Offline system/network.

Using the role approach is helpful to explore structures of group interactions within sociotechnical systems – the actors, the group and the system/network are parts of that theory. Our advanced role theory explains the social co-construction of online and offline *reality* by social actors situated in roles. Following our prior work [5], a role is socially constructed by

- a formal position within a system (online community, network, group etc.) created by someone, e.g., designers or managers
- a formal function as well as tasks related to that position
- explicit and implicit behavior expectations of different people towards the position which change over time
- dynamics of role-playing (e.g., same role but different role-playings by different actors)

Roles can be visible but can also follow a hidden agenda. A role is not a static phenomenon; it is rather a socially co-constructed formal-informal complex and (un-)conscious negotiation of actors embedded into broader social systems influencing each other, based on a historical body (“role-mechanisms” [5]).

Mixed methods

For this paper, we focus on the analysis of log files and content analysis in addition to online questionnaires in 2002 and 2008/9. The quantitative survey included 24 standardized and open-ended questions, was four weeks online and 345 questionnaires returned (response rate of ca. 20 percent of all enrolled students of 2,000). The quantitative data have been analyzed with SPSS 7. Table 1 shows the elements of the role theory, operationalized and connected to the forms of data collections [2].

Table 1. Advanced role theory & data collection

Role Theory elements	iForum (operationalized)	Data collection
position in the iForum	What kinds of members (self-perception)	Questionnaires, Log files
function/tasks	Degree of contribution (self-perception)	Questionnaires
behavior expectations	What members expect towards the others	Open ended questionnaires
role-playing (co-constr.)	What do the members really do?	Log files; content analysis

Description of the open, free, online iForum

The iForum is a PHP technical system. Users need only an Internet access to read the iForum. To post, a registration with a free username is required. iForum supports a public communication based on the anonymity of its users. This is different to traditional LMS, which require registration given by the university administration desk and the real name of the users. In 2008, iForum had more than 30 sub-boards. The sub-boards exist for a) courses like lectures and seminars (e.g., to discuss exercises or

content of lectures) and b) study organization, for example, users share knowledge about the CS degree, information about ‘how to manage a study for a degree’. The decision about the topics mainly depends on what the students want to discuss. The iForum is characterized by a large size (1,500 users) and an extended lifespan, started in 2002, lives until today, providing a space for interactions, usually asynchronously.

3 Results

Positions and functions in the iForum: self-perception & the other reality

In December 2008, around 1,500 individuals had an iForum account. Usually, the core group has fewer members than readers and lurkers (e.g., [13]).

Table 2. What the users say *and* what they do

iForum	What the users <i>say</i> (questionnaire) n=345	What the users <i>do</i> (logfiles) n=1,478
Core group	8	18
Registered lurking (Newbies)	30	22
Regular/peripheral members	62	60
	100 percent	100 percent

According to the log files, a total of almost 1,500 members from 2,000 students were registered but 22 percent did not contribute actively. They are only registered. What the members say and what they really do is shown in table 2. The core group and registered lurkers differ in around 8 and 10 percent. To the question “Do you label yourself as a community-member?” more than 70% of the students agreed (n=188). This is a surprise since it means that not only the core members but also active and peripheral members rate themselves as part of iForum.

Learning activities: behavior expectations towards contribution/participation

More than 71% of the respondents use the iForum “to ask subject-specific questions about courses”. They do this often, once a week and more than once week. Around 66% use the forum for a) sharing information about lectures and tutorials b) solving exercises online collaboratively, and c) learning to handle different opinions [6].

Non-active contributors (registered lurkers): More than 300 registered members did not contribute but were registered (contribution=0). These registered iForum-lurkers are about 15% of all 2,000 students. According to Preece et al. ([13]), there are various reasons for why users do not post (e.g., no motivation, curiosity). To understand the reasons for non-contribution, we had an open question that 113 students answered (coded afterwards). The survey collected different motivations, why iForum-users have an account but do not actively contribute, read table 3.

Table 3. Motivations for reading and lurking

Motivations of non-active contributors in iForum (open question, coded)	% (n=113)
“Questions, I have, already there in the iForum”; “answers already available” (F1)	31.8
Communication problems/weakness: “difficulties with language”, “shy”, “I’m	16.8

afraid of asking sth.”, “I do not want to ask stupid/dumb questions” (F2)	
Forum as information source: “an account has the advantages to get information what happens in which sub boards”; “automatic notification via email” (F3)	15.9
No motivation: “no interests”, “I’m too lazy”, “I have no time” (F4)	15.4
Questions can be clarified on other ways: “Face-to-face is better”; different contact points available; no need for information online, “I see no necessity” (F5)	12.4
“No special topics available where I can say something” (F6)	8.0

Contradictory forms of role-playing?

We studied the role-playing of iForum-users. Most of the answers are “*I ask unclear and unsolved questions*”, and “*I need answers or solutions*”. Some interviewees also mentioned they like to help other students: “*I help other students since I hope they will help me later, when I need help*”, “*That’s the sense of a community, we help each other*”, and “*Only active members affect active, vivid forums*”. Other interviewees did like the opportunity to get in contact with others at unusual time slots, “*direct contact possibilities at unusual time in the night*”, and stress the anonymity: “*because of the anonymity, I can ask ‘stupid’ questions*”. During the data analysis two new aspects for active contributions came up. These are (1) criticizing deficiencies and (2) gaining attention out of a huge group:

Ad 1) Students use the iForum to criticize shortcomings within the study program. The respondents said: “*I want to show my opinion*”, “*I can show my anger by using anonymity*“, „*I can scarify deficiencies*“, and “*When I’m annoyed about something or somebody, I can say it in the forum*“.

Ad 2) The users use the forum to get out from the huge group of learners. Students perceive those large groups as ‘anonymous mass’. So, when writing something in the iForum, they want to show their individual faces and voices, and try to gain attention: “*I post because I have to say something*“, and “*Sometimes, I even want to say something*“. Some users stressed especially the factor of awareness: “*I think the professor will be better aware of me when I’m active in the iForum. So, I’m not just a pure number for him but become an individual*“.

The interesting result is that anonymity has a contrary function. Because of the anonymity, some students use the forum to show their anger or to reveal aspects they do not agree with. On the other hand, some other members use the iForum to gain more attention and getting out of the anonymity of large groups by saying something and by creating a voice. By participating online, some members expect that other people would perceive their individual voices better than without the iForum. Additional data supports this. Almost 55 percent (n=133) agreed “*the iForum (digital life) has a positive impact on my offline life*“.

4 Implications – Preparing for informal-*in*-formal learning

Designs for the conative level of learning: The results about the iForum indicate a special feeling of a membership. This feeling is expressed in terms like “*That’s the sense of a community, we help each other*” (interviewees). It seems that the group

feeling within the forum activates a) the user's perception of having a specific form of social proximity triggered by technology and b) activates the conative level of learning. The term "conation" refers to a concrete action conducted by a learner; s/he does not only know but s/he really acts, s/he is willing to do sth. and really *does* [12]. The concept of conation stresses what a learning outcome really is, a changed behavior of the learner. This level of learning is often neglected in formal schooling where the cognitive learning 'learning what' and 'textbook knowledge' is focused without supporting the learners to practice this in action or to reflect practices. Traditional teaching neglects the designs for learning as an active process including reflective action (students as pro-sumers) but also neglects to create *designs for* social relations among students as well as teacher to students.

Conclusion. This short paper illustrated a differentiated picture of informal learning added to a formal education; *read the long version online* [6]. Online boards can be a differentiator that supports the individual needs of users. Such a flexibility of a "just-in-time-communication" ([8]) is useful to engage students in learning and can also link weakly coupled learners. The addition of informal learning expands formal education and leads to an all-embracing learning experience that activate learners on all levels such as the cognitive, affective and on the *conative level* as well; this is what we call *designing for* technology-embraced informal-in-formal learning.

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