Conceptualizing a Framework for Design of Online Communities

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The marked advancements in technology, coupled with the current emphasis on life-long learning and need for individuals to collaborate in groups to construct knowledge, has lead to a proliferation of online communities. Most efforts on building online communities focuses on integrating communicative technologies, placing little emphasis on designing the social interaction. There is a lack of a framework to inform the planning needed to support the sociability that will lay the foundation, on which online communities can grow and thrive and achieve their objectives. The goal of this article is therefore to fill this void – by deriving a framework to guide such efforts. The planning of such an online environment entails the conceptualization of objectives and the definition and crafting of roles and rules to steer members to achieve these objectives of the community. This article adopts Activity Theory as a framework for analysis.

UNDERSTANDING THE NOTION OF COMMUNITY

"Community" is a term that is used in different fields such as sociology, anthropology, psychology, philosophy, advertising, business, popular culture, and education (Barab, MaKinster & Scheckler, in press) and therefore subjected to varied interpretations. Even the Dictionary of Sociology (Abercrombie, 1998) admits that the "term community is one of the most elusive and vague in sociology, and is by now largely without specific meaning" (Preece, 2000, p. 175).

Traditionally, community has always referred to a group of people who live together in close physical proximity. However, it can also be used to refer to a group of people who share a common way of making a living, for example, a community of accountants (Barab, MaKinster & Scheckler, 2001). A community has also been used to mean a group of socially independent people who get together to discuss, make decisions and share practices (Barab, MaKinster & Scheckler). Yet others have taken it to indicate a group of people who, for at least a period of time, interact with each other and share common ties and an area between themselves and other members of the group (Hamman, 1997).

Preece (2000) identified the following elements in a community: (a) collective purpose of the community, (b) its goals, (c) roles of the individuals in the community, and (d) the policies that are generated to guide social interaction, and saw these as instrumental to the life of a community. People form and join communities to achieve a shared purpose, which typically involves the following tasks: (a) exchange of information, (b) provision of support, (c) informal socialization, and (d) discussion of ideas (Preece). In the process, they form relationships. Relationships in communities are influenced by the "frequency, companionable contact, mutual reciprocity, supportiveness, and longevity in the community" (Preece, p. 177). Another important element in a relationship, and hence in a community, is trust (Preece). Trust is the positive

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expectation that a person has for another person to behave in a regular, honest, and cooperative way, based on accepted norms (Fukuyama, 1995), past performance, and truthful future guarantees (Shneiderman, 2000).

Therefore, establishing and communicating the purpose of a community, defining the roles of its members, crafting policies to guide the interactions, and building trust in the relationships in the community are critical. The social interaction as a result of these relationships in a community sustains the purpose, and therefore the community.

ONLINE COMMUNITIES AND ACTIVITY THEORY

Some entrepreneurs regard any online communication through chat, bulletin board, or any communications software, as an online community (Preece, 2000). Are they right? Rheingold (1994) defines an online community as "a group of people who may or may not meet one another face-to-face, and who exchange words and ideas through the mediation of computer bulletin boards and networks (Rheingold, p. 57-58).

Members of online communities join together online to do everything which others do in the physical world, with the exception that online interactions are largely restricted to text on computer screens. The factors that make or break a community, whether face-to-face or online are issues of trust and identity, clarity of purpose, and boundaries (Rheingold, 1994). An online community essentially consists of the following criteria:

- People, who interact socially as they strive to satisfy their own needs or perform special roles, such as leading or moderating
- A shared purpose, such as interest, need, information exchange, or service that provides a reason for the community
- Policies, in the form of tacit assumptions, rituals, protocols, rules, and laws that guide people's interactions
- Computer systems, to support and mediate social interaction and facilitate a sense of togetherness. (Preece, 2000)

Central to the activity theory is that the activity is socially and culturally determined, and very much tied to the context that takes place. In the activity theory, the unit of analysis is an activity, which is undertaken by either an individual or subgroup, using tools to achieve an object (objective), thus transforming the objectives into outcomes (Hung & Wong, 2000). In its simplest terms, an *activity* is defined as the engagement of a subject toward a certain goal or objective. Activities are distinguished from each other according to their objects. Activity theory posits that an activity system contains six interacting components (subject, object, community, division of labor, rules, tools), which are organized to achieve the activities of the activity system (Jonassen, 2000). Figure 1 shows the six components of activity theory.

There are three central components in activity theory, the subject, the object of the activity, and the community where the subject is from. The subject can be either a person or a small team engaged in an activity, while the object (or objective) represents the specific direction of the activity. An object can be either a material or an intangible thing such as a plan or idea, as long as it can be shared for manipulation and transformation by the participants of the activity. The subject is constantly interacting with the environment to reach its object (mediation) in a community comprising other people who share the same objective as the subject. The other three components of activity theory are tools, rules, and division of labor. Tools can be either physical objects such as computers or pens; cognitive tools such as spreadsheets, or psychological tools such as language and ideas that enable the activity to be carried out. Rules include both implicit and explicit norms, conventions, social relations, even timelines and process. Division of labor refers to the various roles and distribution of responsibilities/power that different subjects in the community undertake to achieve the object. The tools will mediate the processes between the subject and the object; rules mediate the processes between the subject and the community; while division of labor mediates the processes between the community and the object.

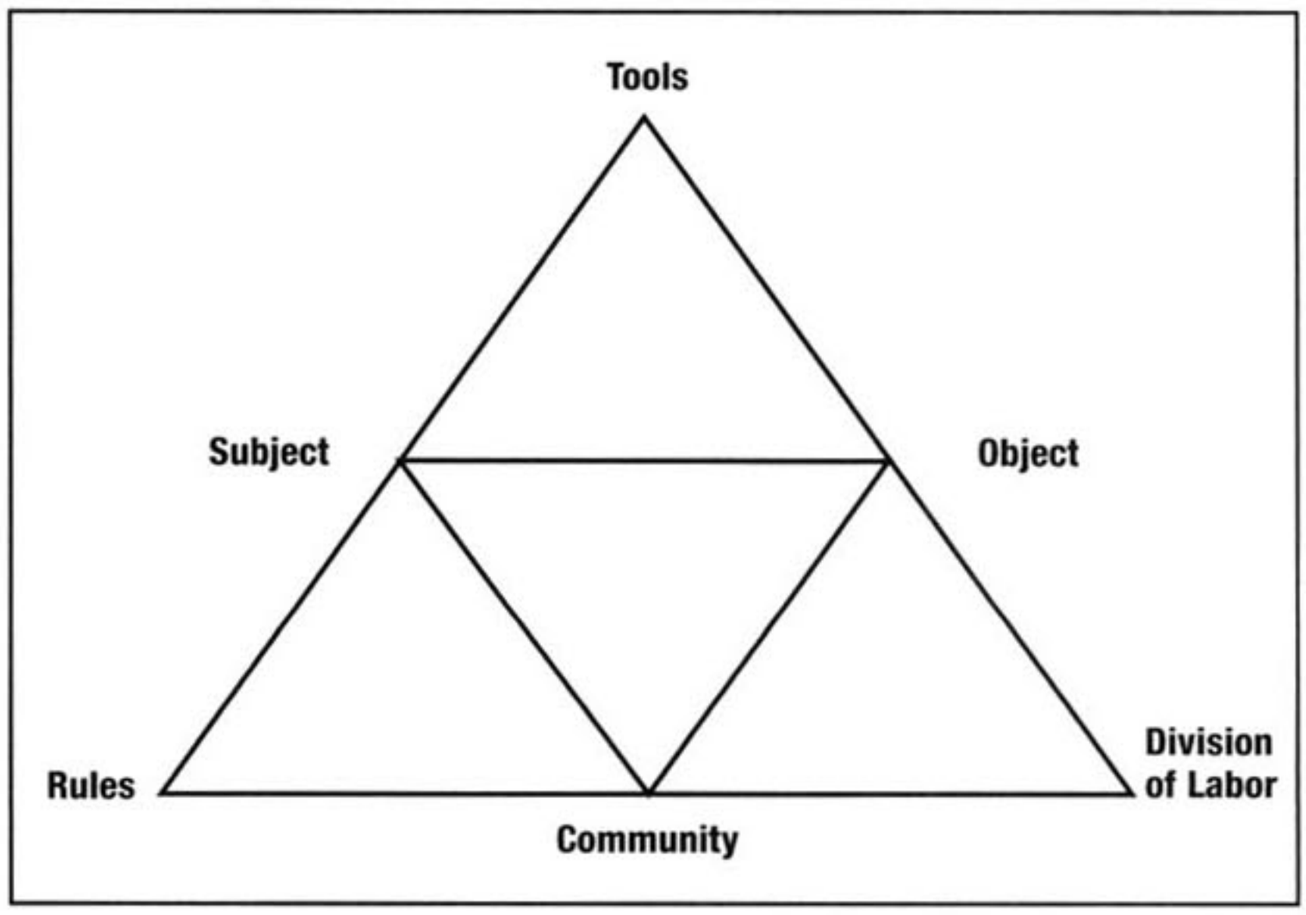

Figure 1. Activity theory framework

Since online communities are a relatively new phenomenon, we appropriate a learning communities' framework in the traditional sense and apply such a framework back into our analysis of online communities. If we adopt the view of enactive constructivism (Bopry, 1999), organisms such as humans engage in meaning making with the environment through structural coupling, and in the process achieve a state of stability and shared meanings (with others). If we take such a view, then learning is a state of being as organisms transact with the world. The categories of "learning" and "nonlearning" are observer-theoreticians' categorizing of what learners are engaged in. In this sense, humans engaged in work and experiences can be seen as learning and vice versa.

COMMUNITIES IN THE EDUCATIONAL SETTING

The community-based perspective is consistent with the belief that learning is a participatory process that involves doing, becoming, and belonging, not simply acquiring. Many educators are therefore looking towards the design of communities as environments to support learning (Bielaczyc & Collins, 1999). We conjecture at this stage of the article that there is overlap between online communities for work purposes, with learning communities in the educational contexts. A learning community is a community, which is cohesive and has a "culture of learning such that everyone is involved in a collective effort of understanding" (Bielaczyc & Collins, p. 2). In a learning community, both the individuals and the community as a whole are learning how to learn and knowledge is constructed through involvement in the community's shared values, beliefs, languages, and ways of doing things. Bielaczyc and Collins (1999) identified a learning community as having the following four characteristics:

- diversity of expertise amongst members;
- shared objective of advancing collective knowledge;
- emphasis on learning how to learn; and
- mechanism for sharing what is learned (Bielaczyc & Collins, 1999).

The learning communities approach raises some issues about the design of learning environments. Bielaczyc and Collins (1999) identified the following eight issues, which they treated as dimensions:

1. Goals of the Community: Students draw from each other's diverse knowledge to work towards a deeper understanding.
2. Learning Activities: A variety of learning activities are used, to provide for both individual development and collaborative construction of knowledge.
3. Teacher Roles and Power Relationships: The teacher's role is that of an organizer and facilitator of student directed activities. Students are responsible for their own learning and that of others. Students also develop ways to assess their own progress and work with others to assess the community's progress.
4. Centrality/Peripherality and Identity: There are many ways and levels of contributions, which are all valued, be they central or peripheral. Members take on different roles at different times and need to respect other's differences.
5. Resources: Resources and process of learning are shared among members. Both members and the community are viewed as important resources.
6. Discourse: Members are expected to give feedback to each other and as a community they develop ways to share ideas, knowledge, and skills through negotiation and coconstruction.
7. Knowledge: Members develop in depth understanding on certain key ideas and share knowledge and process of learning with the community, contributing to growth of community.
8. Products: Members work together, usually over months to produce artefacts or performances that can further the understanding of the community (Bielaczyc & Collins, 1999).

Bielaczyc and Collins (1999) used the framework of eight dimensions of learning communities to analyze and compare three exemplary cases of classroom-type (commonly face-to-face, except for Computer-Supported Intentional Learning Environments [CSILE], please refer to the study) learning communities that have been set up in American schools and outlined 14 principles for the design of learning communities. The 14 principles, identified by Bielaczyc and Collins are summarized in Table 1. Our hypothesis is that the principles for the design of face-to-face learning communities, identified by Bielaczyc and Collins, should be relevant for online communities as well since the latter also emphasizes the acquisition of knowledge through participation in a community. The aim of this article, to reiterate, is to consider how community principles can be applied to online communities.

The preceding principles are congruent with principles noted in literature on communities of practice applied to work situations (Brown & Duguid, 2000). In today's emphasis of life-long learning and knowledge organization within communities of practice, the principles discussed can

generally be appropriated into work contexts. Communities of learners are principles of design appropriated originally from communities of practice, simulating the collaborative and work processes within practice and applied to schooling.

METHODOLOGY FOR FINDINGS

Since the focus of this article is on principles that guide the planning and design of online communities (not online learning communities in themselves), informal *ethnography*, that is observation in the communities as a registered member, will be used to gather information about the three chosen online communities used in this study: Epinions.com, AskMe.com and Learnweb.com. Thus, for the selection of cases in this study, the first two are online communities, and the third is an online learning community. A quick survey of the online communities on the Internet will indicate that thriving online communities are not directly linked to educational contexts. For the purposes of this study, a selection based on thriving online communities would provide us with a better representation of why and how an online community works. Epinions and AskMe are relatively well accessed sites.

For this study, access to the online communities is gained by registration for membership. Most of the observation will be made, by reviewing the activities, policies, and other ongoings and details (such as last logins), about the communities. Repeated visits will be made over a period of three months (duration of study) to confirm the observations, if necessary. For example, for the preliminary observations, visits were made at different times to confirm that the activity level observed was not confined to only a few isolated topics or categories. To focus the observations during the visits, the principles for the design of learning communi-

Table 1. Principles for the Design of Learning Communities in Educational Contexts

S/N	Principle	Summary of Description of the Principle
1.	Community-Growth	• Overall goal: Community expands Knowledge & Skills • Individuals gain new knowledge and share with community
2.	Emergent-Goals	• Needs, interests and abilities of the individuals must be taken into account • Goals of community should help students build their strengths and weakness
3.	Articulation-of-Goals	• Goals of community must be clearly defined • Criteria for meeting goals must be clearly defined
4.	Metacognitive	• There must be some mechanism for the community to evaluate what was learned and how well they did
5.	Beyond-the Bounds	• The community must seek diverse opinions and views on a topic, welcome new approaches and challenges instead of simply seeking support for their current beliefs
6.	Respect-for Others	• The rules for respect for others should be clearly enforced and articulated so that students feel safe to contribute
7.	Failure-Safe	• A culture of accepting failure must be present
8.	Structural-Dependence	• Communities must be organized such that individuals must be dependent on others' contribution in some way
9.	Depth-over Breadth	• It is necessary for students to investigate topics in enough depth so that they can gain expertise in the topics • Ideally these topics should be important ideas that will lead them eventually to understand a broader range of topics • Students should at the end learn how to learn
10.	Diverse-Expertise	• Students develop the areas in which they are most interested and capable, with the responsibility that they share their expertise with the other students and their teachers • Participants learn from what others do
11.	Multiple Ways to Participate	• There should be different activities/roles for students to participate in. All these roles and contributions should be valued
12.	Sharing Principle	• There should be some mechanism whereby knowledge and skills can be shared with the community, so that each student is both a learner and a contributor
13.	Negotiation	• Argumentation is necessary for finding better solutions and understanding • Participants need to be coached in how to depersonalize critiques
14.	Quality-of Products	• There must be agreed standards on what makes for good quality work, and these must be tested against the outside world

ties, contributed by Bielaczyc and Collins (1999), will be grouped under the different components of activity theory to derive a more structured and systematic framework to guide the analysis. Integrating the principles for the design of learning communities with activity theory helps put into perspective the different areas of considerations (object, rules, division of labor, etc.) needed to guide the planning of social interaction.

While Bielaczyc and Collins's (1999) principles for the design of learning communities provide a comprehensive checklist of the important ingredients needed for a learning community, the activity theory, with its six components, provides a systematic framework for analysis. The activity theory focuses on the interaction between human activities within the relevant environment and it emphasizes understanding the system as a whole. As online communities are heavily influenced by a myriad of sociotechnical factors, the activity theory, which also has its roots in sociocultural theories, is an appropriate framework to analyze online communities. In the context of online communities, activity theory reveals very clearly that internet communicative technologies are only one component of the activity system. This puts into perspective the role of these technologies as tools to facilitate social interaction and reminds us that there are other components to consider in the design of online communities. Though Bielaczyc and Collins's principles are actually all design "rules," those "rules" that guide the selection of the object and others that help to define division of labor are classified accordingly, under the corresponding components of the activity theory. The following framework (Figure 2), integrates the principles for the design of an *online community* with activity theory, to present a systematic way to analyze the three online communities. We have thus integrated the principles of Bielaczyc and Collins's into activity theory because we recognize that the 14 principles can be applied to the context of online communities.

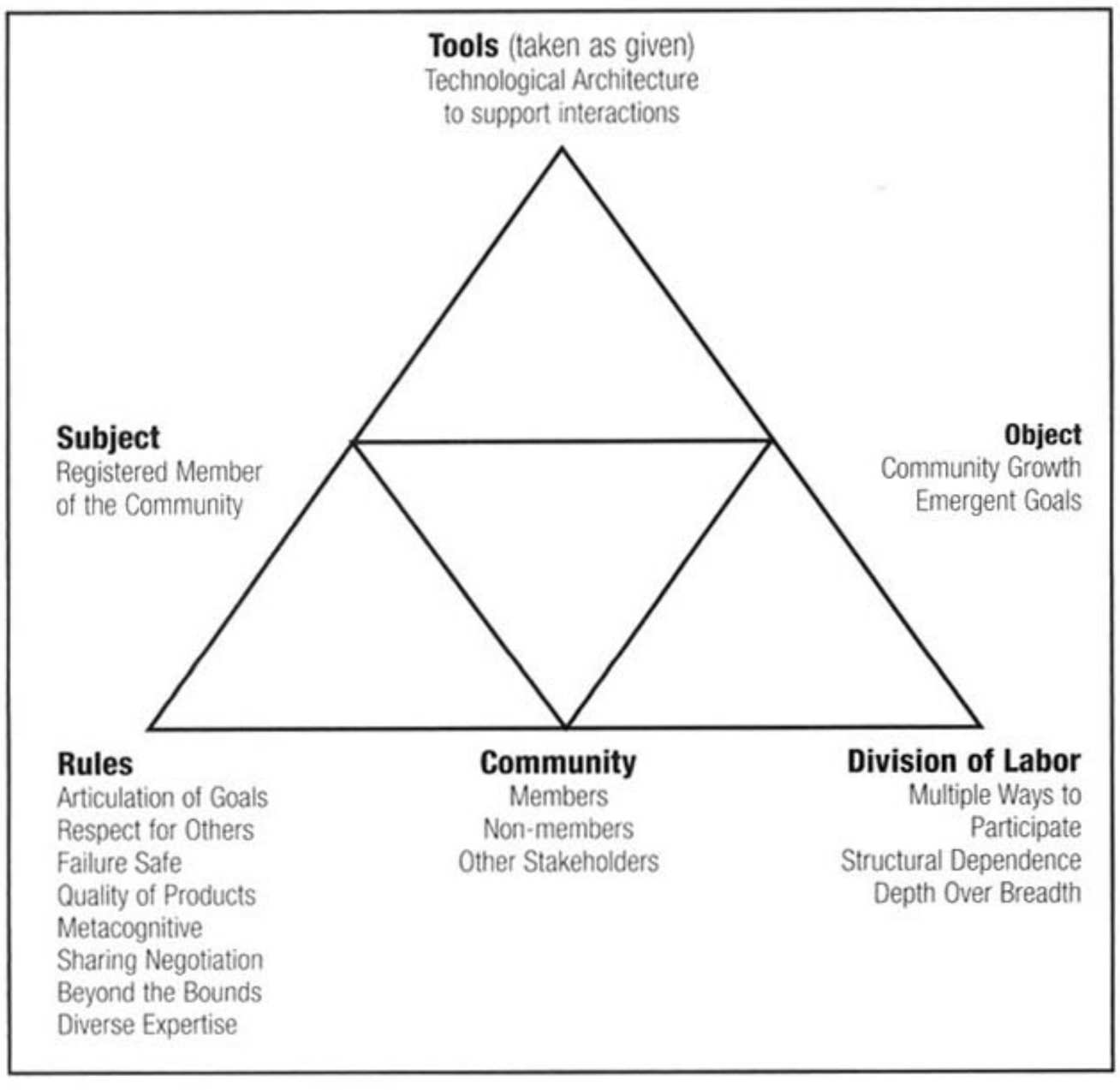

Figure 2. Online communities framework

ANALYSIS AND IMPLICATIONS

Observations and analysis will now be made of the three selected online communities: AskMe, Epinions, and Learnweb, from the perspective of a registered member. The framework in Figure 2 will help clarify how the different principles are used to shape the various components (rules, division of labor, etc) of an activity system. After the analysis, if Epinions and AskMe, which are thriving communities, are found to have *incorporated principles for learning communities*, then it will be taken that these principles contribute to the success of online communities. Implications will be drawn after analysis is done against each of the fourteen principles.

INTRODUCING EPINIONS, ASKME, AND LEARNWEB

AskMe provides Question and Answer service on the Web to people from around the world, by connecting people with questions, to people with answers. The aim is to reach out to a vast community with diverse background and knowledge. Registration for membership is open to anyone above 13 years old and the only information requested is the member's e-mail address. To ask a question, members either browse through the listed categories to find the right one for his/her question or use the search engine available and type in the subject of his/her questions. If the category is not available, he/she can suggest his/her own categories by filing in a form and sending it to the webmasters to consider for inclusion. If this category is included, he/she will be informed by way of e-mail. This assumes that the member decides to post a question and waits for an Expert to ask his/her question. He/she can choose to be notified by e-mail when an Expert has an answer for him/her. The e-mail will contain a link to the answer page. Otherwise he/she can check back on AskMe's web site. When there are answers, the "Members Only" button at the top of the screen will flash

the message "New Answers." The member can also sign up as an Expert in a category anytime. Once he/she has done so, users will start asking him/her questions. Again he/she can choose to be notified by e-mail when a member asks him/her a question or he/she can check back at the website. To motivate questions and answers from the members and experts, rankings and a point system is used. Members earn points upon signing up as a member, but these points go down if he/she is inactive. Further points are earned by the following means: (a) refer a friend; (b) ask cool questions; (c) rate the answers to his/her own questions; and (d) rate other people's answers. Those who have signed up as experts also get to earn points by the additional means: (a) answer questions from others; (b) answer questions in a timely manner; (c) reply to Question Board postings; (d) get rated by others; (e) e-mail your profile to others; and (f) add descriptive words to your profile. For the experts, there is also the ranking system which is a scale used to measure the Experts' recent activity on the site. Rankings are based on the number of points an Expert has accumulated over the last 30 days. Again if the experts are inactive for a period, their points will go down. Public ratings are a way for members to express their opinion about the expert's answers, but they do not affect his/her points nearly as much as the rating given by the questioner. The top 10 experts are featured and highlighted on the homepage. Both the points and ranking system are updated daily. The use of the website are governed by the following rules and guidelines: (a) rules of conduct, (b) terms of use; (c) privacy statement; (d) copyright; and (e) report of abuse. Through the eyes of activity theory, the subjects of AskMe are the registered members (subject) who are seeking answers to questions (object). Experts registered with the website are at hand to answer questions, which are in turn rated by the questioner (division of labor). To encourage contribution, the points system and ratings are used (rules) and supported with the necessary technological system which will track and award points (tools). All these exchanges happen in a community that includes members, experts, website administrators, and visitors to the website (community). Figure 3 sums up AskMe as seen through the lens of activity theory.

The Epinions website aims to help people make informed buying decisions. It allows members to share their personalized recommendation about products and services and make comparisons before buying. Members' recommendations are available to all visitors of the website. It is a platform for people to share their reviews and comments, both good and bad, of over 2 million products and services in over 30 different categories. It boasts of more than 1 million reviews and comments. In addition to detailed product reviews, there are buying guides, price, and availability options through a list of merchants. Registration for membership requires the members to submit their e-mail addresses. Any registered member can participate by writing a review, rating a review, or adding a reviewer to his/her Web of Trust, which is a network of reviewers whose reviews and ratings he/she consistently found to be valuable. Members are advised to exercise discretion when adding people to their Web of Trust as other members who trust him/her will in turn depend on his/her Web of Trust to find the best reviews when making decisions. A review must be a minimum of 100 words and pass an automated language check before it is published. To guide new members on the standards for writing reviews, they are asked to read a sample review and some tips and guiding questions such as: (a) describe everything that comes in the box with the product; (b) did the product work well?, and (c) who should buy the product? Who shouldn't?

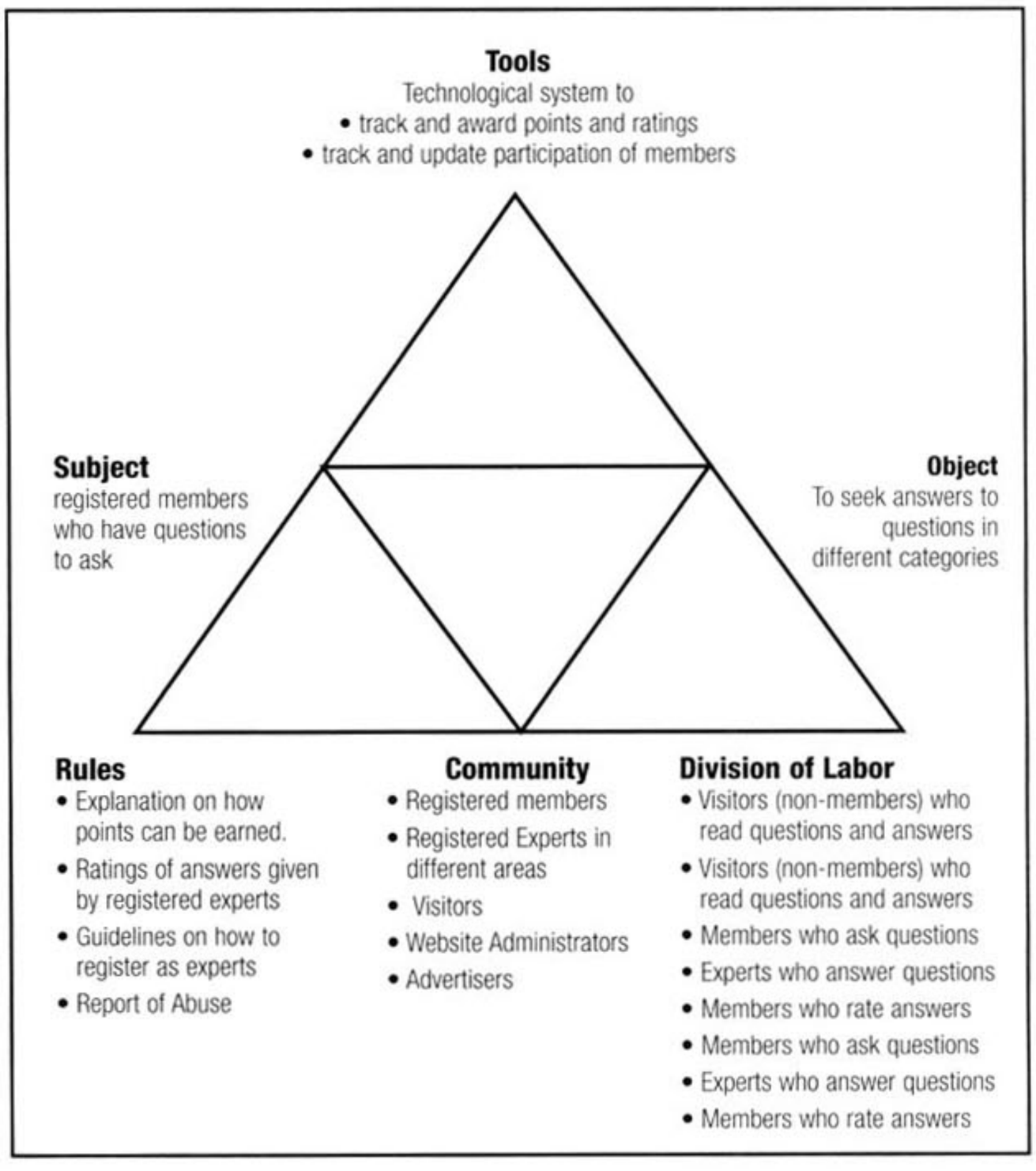

Figure 3. AskMe seen through the lens of activity theory

If the product is not available, members can Suggest A Product. The people behind the reviews are highlighted so that the users can make decisions about the value of the opinions. In addition to user biography pages, review lists, and the ability to comment on reviews, Epinions has introduced "tickets" to flag members who violated the User Agreement. This mechanism allows shoppers to discount certain members' advice, and to stop seeing advice from these members. On the other hand, active reviewers who give good reviews are highlighted as Top Reviewers and Editors. To encourage members to contribute good quality reviews, monetary incentives are given in the form of: (a) e-royalties credits, redeemable in U.S. dollars. These are given for reviews submitted and depend on the number of member visits to the product reviews; (b) income share, if members contribute reviews that help other members make decisions, either to buy or not to buy the product. Income share bonus is also given for members with strong Webs of Trust and those who submit high-quality writing consistently; and (c) e-royalties credits are updated daily while Income Share is given out monthly.

Looking at Epinions from the perspective of activity theory, the registered member (subject) interested in product reviews is engaged in finding out more about the product and making better buying decisions (object). Visitors to the website can read the reviews and registered members can write or rate reviews (division of labor) in this community, which also consists of the website administrators and the advertisers (community). Rules are in place to guard against abuse and guidelines are available to execute the rewards and recognition system through e-royalties credits and income share (rules). The technological infrastructure (tools) helps to support the interactions and track and update members' profiles. Figure 4 summarizes Epinions as seen through the lens of the activity theory.

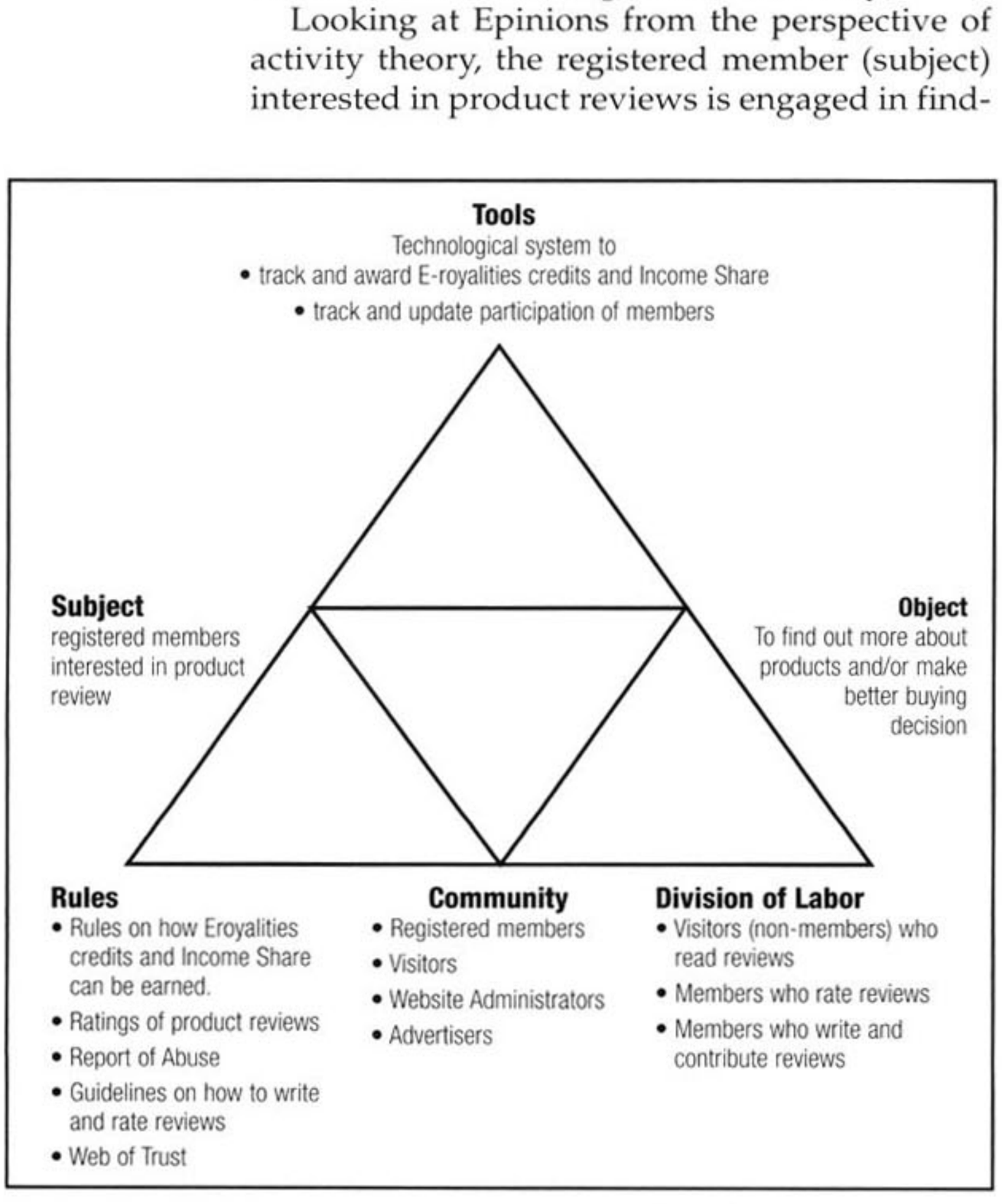

Figure 4. Epinions seen through the lens of activity theory

Though the objects of Epinions and AskMe are different, the two communities use a similar reward system (AskMe with the its points system and Epinions with its E-royalities credits), to encourage participation and recognize contribution; and have multi ways that members can participate. However, AskMe offers its members more flexibility with its wide range of categories/topics. If the categories are not available, they are encouraged to submit requests for more categories. Epinions, on the other hand, restricts members to review preselected products.

Learnweb is an effort of Education with New technologies. The Education with New Technologies (ENT) website is designed to help educators develop powerful learning experiences for students through the integration of new technologies. The ENT website aims to help educators integrate new technologies in teaching, guided by established principles for teaching and learning. The objective is for members to clarify their goals, collaborate with others to extend their understanding, and reflect on their progress through the use of interactive tools, detailed examples of technology-enhanced education, and a valuable collection of online resources. Registration for membership requires the completing and submission of a form asking for particulars such as name, e-mail, and optional details such as background and interest. Members are also asked to select the types of preferred resources. New members are given a walking tour of the ENT website. There are also introductory materials for members to read which discuss topics such as "Introduction to teaching for learning". The Collaborative Curriculum Design Tool in the Workshop (CCDT) allows members to either individually or in collaboration with others, create or modify curriculum units that enhance teaching for understanding new technologies. Members can choose to: (a) create or modify curriculum units individually; (b) collaborate with others; or (c) check out the ENT gallery for write-ups on how

other educators are using new technologies in their classroom. These include teaching and learning materials, strategies for managing technology, examples of student work, and reflections by teachers and students. Members who want to create curriculum units, are guided by templates and sample units. If the member wishes to collaborate with another member, he/she goes to the list of members, browses through their profiles, and selects and invites a collaborating partner by clicking a button. This member will be alerted of the invitation by e-mail.

Through the lens of activity theory, the subjects of Learnweb are the registered members who are educators interested in learning how to create curriculum units that integrate new technologies in teaching (object). In the community are fellow members, expert teachers whose work is showcased, and the administrators and visitors to the website. Templates are used to guide the members along in their design (tools) and guidelines such as those on the use of the forum are given (rules) in the website. Members form groups (division of labor) or work individually and those who are ready can choose to share their work with all the registered members. Figure 5 sums up Learnweb through the perspective of the activity theory.

AskMe and Epinions are communities set up for the purpose of sharing knowledge while Learnweb aims to be a learning community set up for the purpose of establishing exchange of knowledge. Unlike AskMe and Epinions, Learnweb does not have a mechanism for encouraging participation and has minimum rules for guiding interactions. Learnweb boasts of a range of collaborative tools but does not have in place any incentive or system to reward contribution.

ANALYZING EPINIONS, ASKME AND LEARNWEB

Next, the three online communities: Epinions, AskMe and Learnweb will be analyzed against each of the fourteen principles of the learning communities' framework (see Figure 2). In particular, the *Object, Rules,* and *Division of Labor* Components of the activity system are adopted for the systematic considerations of the social design principles needed for online communities.

Object Component of the Activity System

Two of the principles for learning communities: "community growth" and "emergent goals" are classified under the "object" component, as shown in the activity system.

Community growth principle. AskMe allows members to ask questions and get answers so they can increase their knowledge. Answers to all questions are made accessible to all registered members, leading to an increase in collective knowledge of the community. Epinions functions in a similar way with their product reviews, to increase both the individual's and the community's knowledge. Learnweb allows an individual the option not to publish his/her work. While this freedom ensures a comfortable level for the member before his/her work is displayed for all to see, it limits the accumulation of the community's knowledge base.

Implications. *Members of the community should have access to as many of the other members' contributions as possible. While some areas of the work might be confined to individual project teams to prevent copying, other parts, such as the resources might be made sharable. Avenues for members to recommend resources, such as URLs, could be incorporated. The other members can rate the recommendation. Incentives to encourage members to share their work could be built in.*

Emergent goals principle. AskMe boasts of many categories and subcategories, while Epinions has over 2 million products and services covering 30 different categories. The wide range of categories significantly improves the chances of members to get and contribute answers and reviews. Members of AskMe and Epinions can choose the topics according to their interest and their level of involvement. These

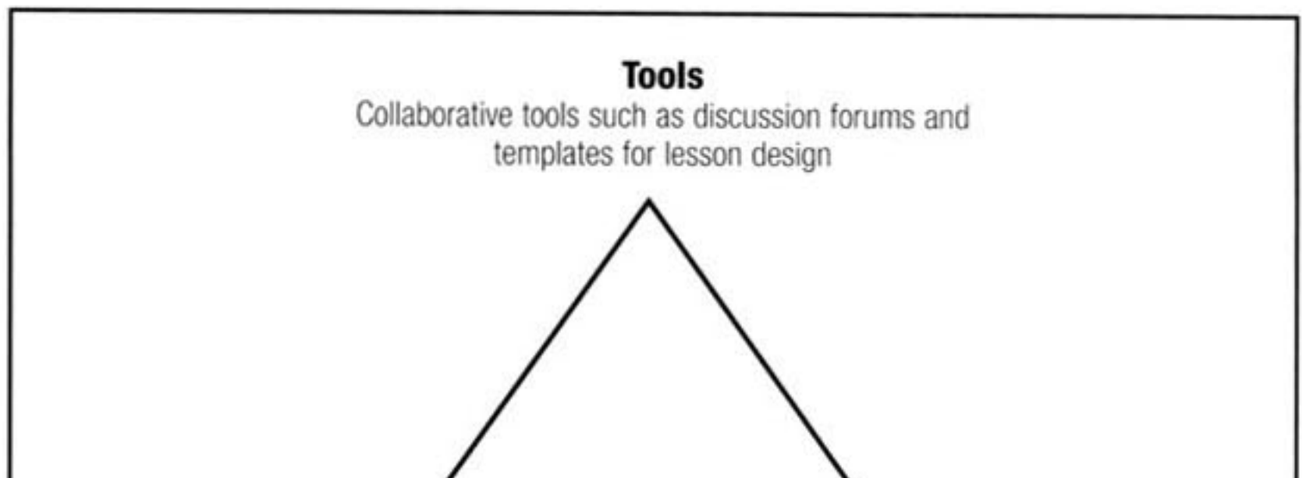

Figure 5. Learnweb seen through the lens of activity theory

range from simple tasks such as rating other members' work, to contributing answers to questions/ work reviews. Members are also given tips on how they can contribute. If the member cannot find the categories that she/he is interested in, they can suggest their own categories through filling out a form and sending it in for the webmasters to consider. The different interests and abilities of the members are taken into account. For Learnweb, the member is also given the freedom to design curriculum units in their preferred subject areas, either individually or by getting someone from the member's list to collaborate. However, there are no defined levels of involvement for the members to choose from. Members are very much on their own to find their collaborating partners and work out their level of involvement. The abilities of the members are not taken into consideration.

Implications. *Clear definition on how members of different abilities in the community can participate and contribute will help members build on both their strengths and weakness, and work out their goals. Provisions must also be made to take into account the interests of the members; for example, members could be given the opportunity to suggest new topics according to their needs and/or interests.*

Division of Labor Component of the Activity System

Three principles of learning communities are classified under the "division of labor" component as shown in Figure 2. These principles are "multiple ways to participate," "structural dependence" and "depth over breadth."

Multiple ways to participate. For AskMe, members can choose the various ways of participation. For example: (a) answer questions from others; (b) answer questions in a timely manner; (c) reply to question board postings; (d) refer a friend; (e) ask questions; (f) rate your answers; (g) rate other people's answers; (h) get rated by others; (i) e-mail your profile to others; and (j) add descriptive words to your profile. These activities span different levels of difficulty. The members can choose to look around to get a feel for the culture of the community, by choosing to look at questions and answers already posted. He/she can move from observing to participation by asking a question. Slowly when he/she feels comfortable, he/she can move on to sign up as an Expert and answer questions and build a name for him/herself. Epinions members can choose to: (a) read a product review; (b) comment on a review; (c) rate a review; (d) send a review to their friends outside epinions; (e) write and submit their reviews about any products; and (f) add a reviewer to his/her Web of Trust. The member starts with a level that he/she is comfortable with, then proceeds to the next.

Members of Learnweb can choose to: (a) read write-ups (in ENT gallery) by expert teachers on how they have successfully integrated technologies in their classroom teaching; (b) design a curriculum either individually or as a group; (c) share his/her curriculum design; (d) create a forum; and (e) participate in a forum. In Learnweb, there are also different ways to participate. However, except for reading the write-ups by expert teachers, the other ways to participate require the members to plunge right into activities that require them to commit a fair amount of involvement. Getting the members to design a curriculum unit on how to integrate technologies into their teaching, after reading the write-ups/sharing by expert teachers, is a big leap.

Implications. *The multiple ways to participate should include different levels of participation. Members should be given a choice to participate at a level suitable for them and have the flexibility to move to a higher level of participation. For example, members who are strong in some areas might like to recommend relevant resources to others, while other members might rate the relevance of the recommendation. If members are working in groups, they could be given a choice of roles (for example, leader or facilitator) to undertake. Activities could be broken down into smaller steps so members can progress through stages comfortable to him/her.*

Structural dependence principle. AskMe and Epinions structured the different ways for participation such that the inputs from one member become new resources for another to act upon. For example, in AskMe, a member posts a question, which needs an expert to answer. The expert's answer, is in turn, rated by the member who asked the question. Members are dependent on each other to carry out the goals of the community. A similar structure exists for Epinions. One member gives a review, while the others rate the review. For Learnweb, the member can choose to work individually, by going through the given samples and using the templates to design a curriculum unit. There is no structural dependence if members choose to work individually.

Implications. *Members should not be given the option to work individually and keep his/her work private. Instead a mechanism, such as the points system, could be used to encourage members to give feedback to each other or collaborate so that structural dependency could be achieved.*

Depth over breadth principle. AskMe and Epinions are not built for education purpose so this principle might not be entirely relevant. However AskMe members have a choice to focus on areas that they are most interested and capable. They can start by asking easier questions on one topic, and move on to ask more difficult questions on the same topic. Epinions requires the reviewer to have in-depth understanding of the product to give good quality review. The Eroyalities and Income bonus are mechanisms used to encourage reviewers to give more thought to coming up with the reviews. For Learnweb, members create content either single-handedly or work with other members. If he/she works alone, he/she would have to complete all different parts of the curriculum him/herself. If he/she works as a team, then it is up to the group to assign the different subtasks to the team members. Though a few expert teachers shared how they have successfully integrated technologies in their teaching, there are no channels for members to clarify their doubts, after reading the writeups by these expert teachers.

Implications. *Some form of motivation and recognition will encourage members to put in more effort and go into greater depths to come up with quality contributions. Linkages with experts should be provided to allow members to explore topics in depth.*

Rules Component of the Activity System

The following principles for learning communities are classified under the "rules" component, as shown in Figure 2: "articulation of goals," "respect for others," "failure safe," "quality of products," "metacognitive," "sharing," "negotiation," "beyond the bounds" and "diverse expertise."

Articulation of goals principle. Epinions gives very clear guidelines on how members can earn the cash rewards, how to write and rate opinions to ensure that the goals of the community are upheld. AskMe makes available explanation of their points system. Both these communities have very clear criteria for success that is enforced by all members in the form of ratings and points. Learnweb, on the other hand, does not spell out the criteria that would have allowed members to check whether they have met the goals of the community. After members have designed the curriculum units, it is up to them to decide if they want to share their work. If they do, then the units will be accessible to all members. The process will stop here unless they go on to work on another unit.

Implications. *The criteria of success should be made known to the members and they should be involved in evaluation of whether or not the criteria are met.*

Respect for others principle. In Epinions, ratings include one option "not recommended," which means that the text is offensive, off-topic etc. Both Epinions and AskMe include a template for members to report abuse of any kind to the webmasters. In Learnweb, there is a list of guidelines for using the forums, for example "...do unto others' writing what you would have them do unto yours..." (**Learnweb, http://learnweb.harvard.edu/**)

Implications. *Guidelines on netiquette, and so forth, could be provided and made known to the community.*

Failure safe principle. In Epinions, members are reassured that they can give bad or good opinions of the products. It's their personal view. This signals to members the acceptance of the community towards experimentation. In AskMe, the members are encouraged to ask questions and try their hand at answering those that matched their area of expertise. Points are offered to entice members to experiment with different activities. The community welcomes efforts on members' part to try out activities. There are no special efforts to instill a failure safe culture in Learnweb.

Implications. *The willingness of the community in supporting attempts of members, regardless of whether or not success is guaranteed, should be explicitly mentioned.*

Quality of products principle. In Epinions, members are given guidelines about standards for writing reviews. Besides "A Getting Started Guide," questions such as the following: (a) Describe everything that comes in the box with this product?; (b) Did the product work perfectly out of the box?; and (c) Does it have any weakness? (**Epinions, http:www.epinions.com/**) are used to guide newcomers in coming up with quality reviews. High-quality, original work is likely to earn five to ten times as much as mediocre reviews on the same product. All the reviews submitted are accessible by visitors to the website. To recognize good quality work, members have the option to add reviewers, whose work they trust, to their Web of Trust. Reviewers who made it to other members' Web of Trust have the opportunity to be "Top Reviewers" or "Editors."

AskMe gives experts recognition and rewards through its list of top 10 experts and point systems to encourage quality answers. Each answer is also subjected to ratings by other members. For Learnweb, while a showcase of good practice is presented, there are no criteria to assess the quality of the curriculum units developed.

Implications

- *Guiding questions help to give members an idea of the quality of work expected.*
- *Members should be involved in giving feedback on each other's products.*

Metacognitive principle. Epinions allows for the community to evaluate the knowledge created (reviews) by building mechanism for rating the reviews. AskMe does the same by implementing ratings for answers. The ratings give members input on how his/her review answers are of value to others. In Learnweb, there are no recommended ways that members can evaluate whether or not their curriculum unit is up to standard, except perhaps if the group takes the initiative to create a discussion forum and give each other comments.

Implications

- *There should be some kind of feedback mechanism, for example a ratings system built-in to facilitate metacognition. Members can then give feedback to each other so that he/she knows his/her level of achievement.*
- *Members working in teams could be asked to sum up their findings by using mindmaps or concept maps, as this would help the team to evaluate their undersatnding. This could be made sharable to other members.*

Sharing principle. Sharing takes prominence in both the Epinions and AskMe communities. The activities revolve around sharing. The central activity of Epinions is sharing of product reviews while that for AskMe is about sharing of knowledge through questions and answers. AskMe uses the points system; Epinions uses E-royalties credits and Income Bonus (redeemable in US dollars) to encourage members to contribute to the knowledge base of the community. All registered members can access the contributions of other members. While registered members of Learnweb can choose to share their curriculum unit design with the other registered members under the Gallery section, the option to work privately without the need to contribute to the community severely limits the accumulation of collective knowledge.

Implications. *While there might be a need to confine the work done by each project team within the teams to prevent copying amongst groups, it is important to share as much of the resources as possible. For example, resources such as those on project management are generic to all the teams and sharing of such materials should be encouraged.*

Negotiation principle. In Epinions and AskMe, the product reviews/answers contributed by members are subjected to critique by others through the ratings system, which allows for feedback to be depersonalized. For Learnweb, if the member is working in a group, the onus is on them to build in negotiation, through the forum or e-mail.

Implications. *Discussion or other feedback mechanism (such as the points system) should be built-in to encourage members to give feedback to others' contribution and to depersonalize the critique.*

Beyond the bounds principle. AskMe welcomes members to contribute answers to a question already answered by someone else, while Epinions members have the freedom to post an alternative review to the same product. This helps other members get diverse input on the same product or questions and decide for themselves which is more relevant or accurate. Learnweb guides the designs of curriculum units with the use of templates, which while helpful for new members, restricts members from trying other new approaches/templates.

Implications

- *While templates are useful for scaffolding purposes, they might limit the adoption of new approaches.*
- *Members should be encouraged to give alternative answers/opinions to others, though there might already be existing contributions.*

Diverse expertise principle. AskMe motivates members, through its points system, to post questions and contribute answers in their area of expertise. Epinions motivates members, through its E-royalties credits to share their personalized recommendations for a wide range of products, so that other members and visitors of the website can tap into the diverse knowledge of the community. Most of the content/resources (questions and answers for AskMe and product reviews for Epinions) are generated by the members and shared in the community. Learnweb's membership recruitment concentrates on getting people who want guidance to develop units. The focus on attracting mainly this particular group as audience creates a demand for expert inputs which other members are unable to fulfill. While exemplary works of some expert teachers are showcased, there is no built in interaction between them and the members. Most of the existing resources, which are rather limited in quantity, came from a central team; the talents of the members are not tapped to contribute resources. Members are also very much on their own to form their own groups to collaborate in the design of curriculum units. Learning from others is limited.

Implications

- *There should be diversity of content; for example, many topics/subtopics, so members can develop the areas they are most interested in or contribute to topics they have expertise in.*

- *Member generated content should be encouraged so members can learn from other members.*

CONCLUSION

The analysis confirms that all the fourteen principles for the design of a learning community contribute to the success of online communities and are therefore principles for the design of online communities. Hence designing online communities involves the following processes:

1. Selecting and confirming that the *object* both allows for the community and individual to gain collective knowledge (community growth), and for the interest of the members to be taken into account (emergent goal).
2. Defining the *division of labor* such that it offers members different levels and ways of participation (multiple ways to participate); divides tasks such that members depend on the input of other members (structural dependency) and allows members to investigate the topics in enough depth (depth over breadth)
3. Crafting *rules* to clarify the goals (articulation of goals) and expected standards of contribution (quality of products); emphasize respect for others (respect for others) and tolerance of failure (failure-safe); encourage new approaches, diverse viewpoints (beyond the bounds), sharing of knowledge (sharing), exchange of feedback (negotiation), self-evaluation and reflection on process (metacognitive) and sharing expertise with others (diverse expertise).

The reasons why some online community efforts succeed while others fail are complex and varied. The total context of activities, including all the people in the community (teachers, students, experts, administrators) who are using rapidly evolving technological tools to accomplish their intended outcomes, must be considered.

Currently, online communication is still largely text based and more favorable to those with better writing abilities. As technology advances and accessibility to the Internet improves, new opportunities and challenges concerned with the design of online communities will emerge and this framework would need to be reexamined. Further research is needed to keep up with the potential offered by the rapid development of technology. We suspect that there would probably be additional principles needed because online communities and face-to-face communities differ in other significant ways, for example, the lack of visual cues in computer-mediated environments. The objective of teasing out principles for the design of online communities has been achieved in this study. This framework, based on activity theory, helps to structure the planning of sociability in the design of online communities into three main areas: (a) object component, (b) rules component, and (c) division of labor component. Through the lens of activity, it can be seen that much of the planning goes into the design of rules to achieve various desirable criteria (such as quality of products) of an online community.

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