DRAFT PAPER

Grazing or Digesting? Preparing University Students for the Information Economy

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Abstract

After working with student groups in online learning communities over a seven year period, the authors compare the nature and the quality of the student learning resulting from student knowledge building in Knowledge Forum ® software and the more dialogue driven approach to collaborative work in the Web 2.0 educational social networking software, Elgg®. With reference to research into the content of postings and student focus groups, initial findings indicate that, due to the rich interconnection of postings both within and between communities, substantial knowledge building is demonstrated in Elgg® even though the grazing and dipping approach taken by the students would appear to be much less focused than the more channelled nature of the work in Knowledge Forum®. The various implications of these findings for teachers working in e-learning are discussed including the need for a change of role with wider acknowledgement of the participation culture, being willing to delegate more control to such learning networking software, and the expansion of their own skills set, while acknowledging the contribution that personal blogging may have to building student confidence.

Background

In 2001, while investigating the work of Wenger (1998) with a view to creating and maintaining an online community of practice, the authors studied the work of Bereiter and Scardamalia (2002), and the idea-centred curriculum as an alternative to problem-based learning. The Knowledge Building Community (KBC) model proposed by Bereiter (2002) offered a model of curriculum change which was suitable for online group collaboration, and prepared students to be innovators, devising their own questions for research and then working as a research community online. A technological affordance to the KBC was provided by Knowledge Forum® (KF) software and a decision was made in 2001 to work with online students in KF.

Knowledge Building

Twenty small groups of post-graduate students at the University of Portsmouth, UK were encouraged to work in KF, during the period 2001-2007, on research ideas in the field of cognition and interface design. Scardamalia (2002) listed twelve ideas described as the socio-cognitive and technological determinants of knowledge building, viz:

1. Real Ideas, Authentic Problems.
2. Improvable Ideas
3. Idea Diversity
4. Rise-Above
5. Epistemic Agency

6. Community Knowledge, Collective Responsibility
7. Democratising Knowledge
8. Symmetric Knowledge Advancement
9. Pervasive Knowledge Building
10. Constructive Uses of Authoritative Sources
11. Knowledge Building Discourse
12. Embedded and Transformative Assessment

Research studies in 2001-2004 (King, 2004), showed consistently impressive results, and demonstrated that students showed evidence of many of these determinants; such as high levels of collaboration, ideas diversity, knowledge building, collectively reaching conclusions which advanced 'understanding beyond the level of the most knowledgeable individual.', Scardarmalia (2002). The nature of the KF software facilitated the work of students in group collaborative areas called 'views' where they could create linked notes (or *build-ons*). Inside the notes they were encouraged to use 'scaffolds' of 'thinking types' like "My Opinion is", "My Theory is ..", or disputational modes such as "Your theory cannot explain ..". By overtly encouraging the students to work like a group of scientists, and construct hypotheses and test these, the determinant of "Epistemic Agency" was much in evidence. But that is not to say that all twelve determinants of knowledge building were evident. Figure 1 describes three determinants which bear more detailed study.

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8. SYMMETRIC KNOWLEDGE ADVANCEMENT
Socio-cognitive dynamics: Expertise is distributed within and between communities. Symmetry in knowledge advancement results from knowledge exchange and from the fact that to give knowledge is to get knowledge.
Technological dynamics: *Knowledge Forum* supports virtual visits and the co-construction of views across teams, both within and between communities. Extended communities serve to embed ideas in increasingly broad social contexts. Symmetry in knowledge work is directly reflected in the flow and reworking of information across views and databases of different teams and communities.

9. PERVASIVE KNOWLEDGE BUILDING
Socio-cognitive dynamics: Knowledge building is not confined to particular occasions or subjects but pervades mental life—in and out of school.
Technological dynamics: *Knowledge Forum* encourages knowledge building as the central and guiding force of the community's mission, not as an add-on. Contributions to collective resources reflect all aspects of knowledge work

11. KNOWLEDGE BUILDING DISCOURSE
Socio-cognitive dynamics: The discourse of knowledge building communities results in more than the sharing of knowledge; the knowledge itself is refined and transformed through the discursive practices of the community—practices that have the advancement of knowledge as their explicit goal.
Technological dynamics: *Knowledge Forum* supports rich intertextual and interteam notes and views and emergent rather than predetermined goals and workspaces. Revision, reference, and annotation further encourage participants to identify shared problems and gaps in understanding and to advance understanding beyond the level of the most knowledgeable individual.

Figure 1: Selected determinants of knowledge building from Scardamalia (2002), chapter 4.

Both determinants 8 and 11 in Figure 1, seek to recognise the importance of the distribution of expertise 'between communities', 'virtual visits and co-construction of views across teams, both within and beyond communities', 'rich .. interteam notes', 'reworking of information across views and databases of different teams and communities'. No inter-community links were found in 20 group views. The individual group views at that time could not be private, but even visits to other views were rare. Students did not demonstrate determinant 9. 'Pervasive Knowledge Building' as work in KF

was in a highly specific virtual space. In retrospect, it is possible that the lack of wider collaboration, either within KF or with the wider Internet, may have been due partly to other influences. It was an assessment driven activity and time was short. There was a lack of awareness by the students of what was possible or constructive with collaboration. KF work in their classroom is often associated with 'cross-talk' sessions where groups give presentations on the progress of their work, which can result in either them or other groups expanding their own postings, but this was not replicated in the online work due to resourcing. There was a lack of affordance to more extensive collaboration by the software. Also it was a tutor impression that the depth and degree of focus displayed by students was essential for knowledge building; an attitude fostered by the designers of KF, who saw it as software offering extensive cross-linking of ideas when other threaded discussion groups at the time could not do this or made it difficult, as evidence explicitly in Determinant 3, (Scardamalia, 2002). However there was no doubt that a high quality of knowledge building work did arise from the very deep channelling of focus by the groups on their own work and their own internal discussions, and the considerable reflective activity this entailed, ruminating on concepts, opinions and theories of the participants, countering with authoritative sources or their own data, and digesting this at a deep level

Elgg® Social Networking Software

As a parallel curriculum development in 2005, teaching moved into Elgg® when students journaling on a blog wanted to allow more granularity in blog postings than was available in software such as Blogger. Elgg is an online collaborative working environment, similar in some aspects to Facebook and MySpace, but designed originally for use in education. It has a wide range of features apart from personal and group blogs, including file uploads, community message walls, and RSS feeds. Elgg is unique as it is user-centric rather than group centric, offering a user-perspective on the work completed. The desire to extend the use of Elgg in teaching was influenced initially by post-graduate students studying e-learning who appreciated that people from the wider community in Eduspaces.net (an installation of Elgg for e-learning practitioners) were commenting on their blog posts. The work of George Siemens (2006) on connectivism was also influential as this develops, "a staged view of how individuals encounter and explore knowledge in a networked/ecological manner". Figure 3 shows the six stages described by Siemens.

1. Awareness and Receptivity	*Individuals acquire basic skills.*
2. Connection Forming	*Individuals begin to use tools and understanding developed in level 1*
3. Contribution and Involvement	*The learner begins to actively contribute to the network/ecology.*
4. Pattern Recognition	*Learners are network aware and competent and …they are now capable of recognising emerging patterns and trends.*
5. Meaning-Making	*Individuals capable of understanding meaning. What do the emerging patterns mean?*
6. Praxis	*Individuals are actively involved in tweaking, building, and recreating their own learning network. Praxis allows the learner to critically evaluate the tools, processes, and elements of an ecology or network.*

Figure 2: Six Stages of Connectivism. Siemens (2006, 46). Contents abridged.

An opportunity arose in 2007 to develop a new course in research methods for 17 second year undergraduate students in the School of Computing. The intention was to introduce the students to the Elgg software through Eduspaces.net, using a set of graduated activities and an appropriate assessment artefact to enable those students to build a simple learning community in Elgg and gain sufficient awareness and skills to be able to cover Stages 1-3 in the Siemens model. During the following eighteen months, it is planned that the students will be supported by tutors in Elgg, and encouraged to continue to collaborate, extend and develop their learning community. A series of six focus groups were planned for 2008 and 2009 to explore student attitudes to Elgg. And, the contents of the postings on the various community forums will be analysed to discover if there was evidence of Stages 1-6 of the Siemens model being completed. The first two focus groups were completed in February 2008, with 8 students taking part, and the results are discussed in the next section.

Initial Findings from the Elgg Research

After twelve weeks of collaborative activity in Elgg, certain developments were evident:

- high levels of student discussion and collaboration.
- creation of group artefacts; published blog carnivals.
- links to authoritative external web sites.
- linkbacks both within blogs, and within different community blogs.
- creation of their own communities for two other taught units, and membership management.
- cross-linking of postings between different diverse communities.
- creation of a social network.

There is clear evidence of students moving through Siemens first three stages.

The focus groups revealed key information about student opinions about the activities in Elgg:

- they claimed to have learnt through discussion and collaboration.
- they wanted more collaboration; as much as possible.
- for the topic under consideration, research methods, they wanted the community to be opened up to many more students in their cohort, especially in the final year, as there would be the opportunity to share ideas across a wide range of research aims.
- wanted the community to be extended to include external contributors especially experts.

These findings were surprising as the students were keen to push the boundaries of the study well beyond what the designers had originally planned. Later reflection on both student demands and the last three stages of the Siemens model revealed that those stages of connectivism, especially Pattern Recognition, really required many more participants to be accomplished, with much more extensive network of community nodes extending well into the Web. Consideration is now being given to meeting the student suggestion of offering membership of the community to a much wider number of their peers at the University and beyond.

Comparison of KF and Elgg Communities

Figure 3 represents a server installation of KF. Each view contains threads of discussions, but there is little communication between them. Each community keeps to its own view.
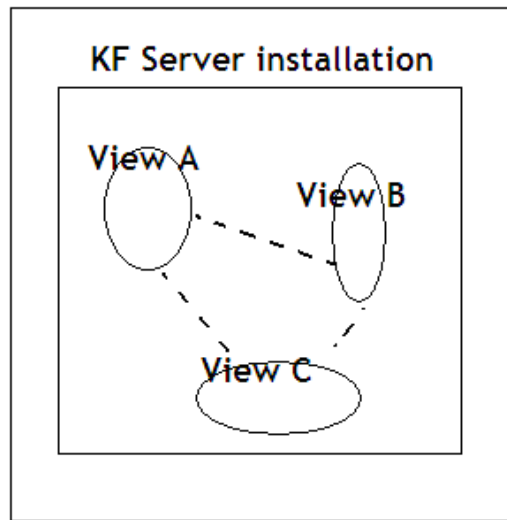
Figure 3: Diagram of a KF Community

However the diagram in Figure 4 shows a screen shot of the contents of one view in Knowledge Forum which displays a complex pattern of links and internal referencing, with links to external websites hidden inside the notes. Rise-above notes are included which encapsulate an emergent artefact generated by the combined effort of the student knowledge building.
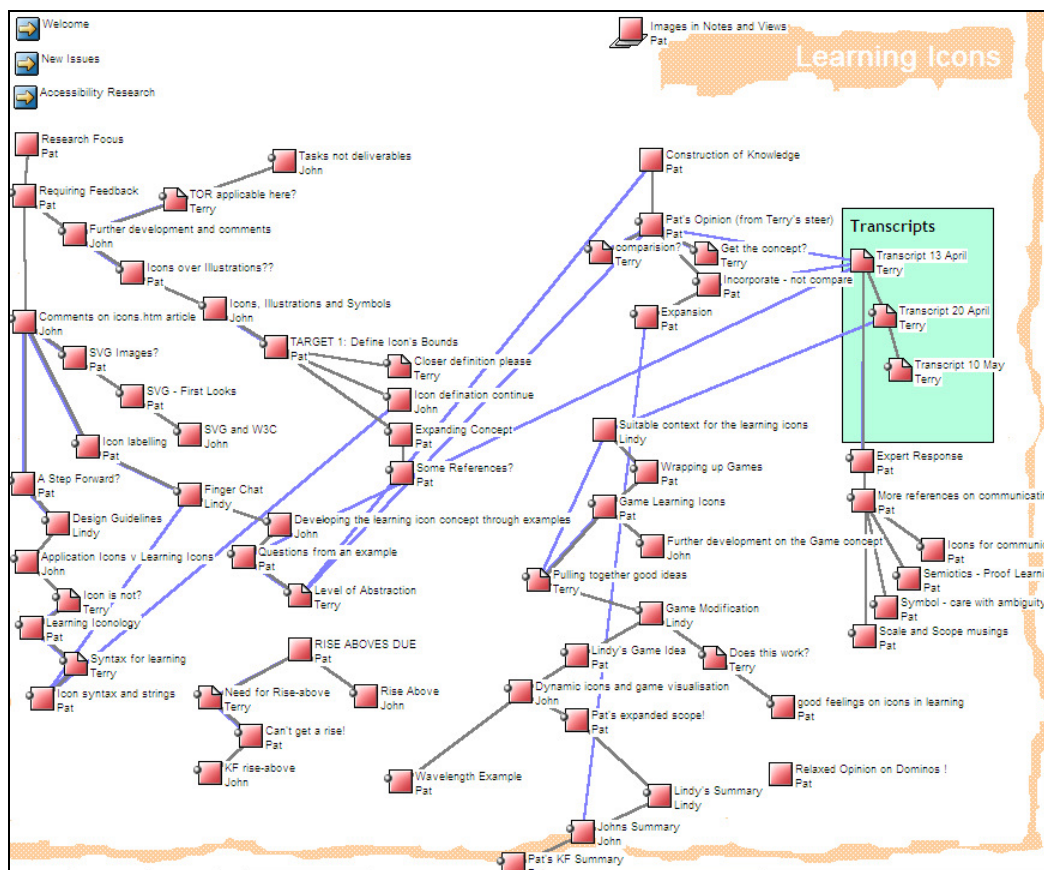

Figure 4: Inside a KF View showing links between postings, referencing and rise-aboves.

Figure 5 shows one Elgg installation with not only a rich diversity of communities, each one containing its own threads of blog forum discussions, and links to external web sites, blogs, videos etc, but also many links between communities, either through full membership or through other links.
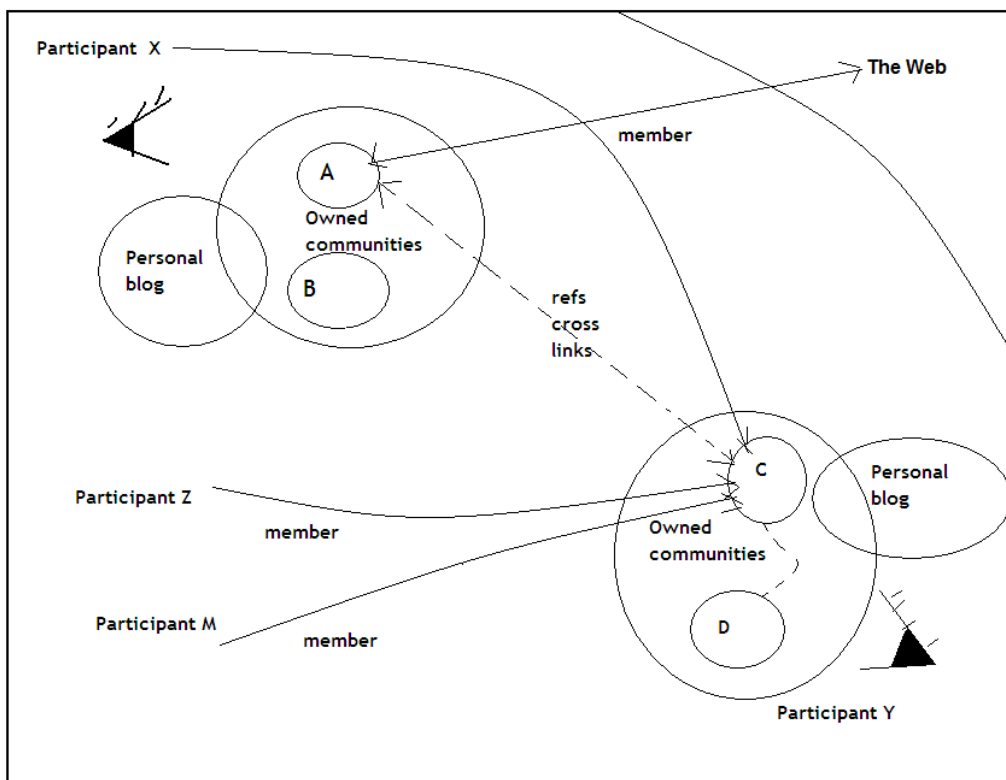
Participant X

The Web

member

A

Owned communities

Personal blog

B

refs cross links

C

Personal blog

Participant Z

member

Owned communities

Participant M

member

D

Participant Y

Figure 5: Elgg communities showing a rich diversity of inter-linking

By comparing Figures 4 and 5, we can see similarities between Elgg communities and the work of a knowledge building community in KF, and our initial findings shows that linked Elgg communities did exhibit extensive knowledge building as defined by the twelve KB determinants. Not just the ones covered by the KF groups but also the three missing determinants:

- Pervasive Knowledge Building
- Symmetric Knowledge Advancement
- Knowledge Building Discourse

This was a surprising finding because it showed that the much less seemingly focused and less channelled approach to student work in Elgg, almost grazing across and dipping into a wide range of communities, can result in as much innovation and the creation of knowledge artefacts as the workers in KF views. It is true that students in Elgg do not exhibit "Epistemic Agency" and did not clarify their thinking, theorising and arguments through the use of scaffolded comments, but one quote from a student in the focus group was interesting:

"If you had an opinion about something, you could read someone else's posting and it was interesting to see another point of view, and see how they had come to that position, the premise of their argument, if they are putting forward an argument, compared to your own, and it made me think more deeply about the issue in hand."

So it is possible that some students were aware of their epistemic thinking, and others, less well versed in critical thinking, were not able to think so clearly. This may be an indication that classes in critical thinking could help all students knowledge build, and lead to more tightly worded and constructive postings in Elgg.

Conclusions for Teachers and Lecturers

You cannot ignore the Participation Culture

Our research to date has shown that students are learning through participating and demanding to participate. They are pushing at the boundaries of our initial provision for the Elgg community work and demanding bigger and wider. Jenkins (2006) defined the *Participation Culture* and listed eleven new skills that students would need to acquire to succeed in that culture. Of these, our current findings indicate that seven can be acquired and practised through community work in Elgg, viz:

- Multitasking
- Distributed Cognition
- Collective Intelligence
- Judgement
- Transmedia Navigation
- Networking
- Negotiation

It seems increasingly unlikely that teachers and lecturers will be able to ignore skills-building in the *Participation Culture*, which will require a shift in their view of their role.

Be prepared to delegate control to the social networking software

Dron (2006; 2007) considers the nature of transactional control in the learning situation. He looks at,"Who is making the choices?". Traditionally the teacher makes the choices and defines the learning trajectory. According to Dron's model, a heavily structured course means control resides with the teacher, a dialogue-rich course passes control to the student. Dialogue enables "the constant renegotiation of control, so learners' needs are satisfied". But the key point he makes is that social networking software such as Elgg which presents options, links, paths, cross-links, trackback, and a wide range of interactions, leads to an emergent structure which provides control over the learning trajectory, "fulfilling the teacher's role". So teachers can look to letting the emergent structure do some of their work in providing the learning trajectory, letting the learners decide how much control they want. In this respect, it would be better to re-name 'social networking software' as 'learning networking software' to emphasise its potentially powerful role for education.

Teachers will need an extended e-learning skills set

Currently teachers often familiarise themselves with e-learning in the context of an institutional Virtual Learning Environment. This demands an emphasis on the technical or software skills that are needed to create and upload content, possibly just electronic documents. Some staff acquire skills in moderating threaded discussion groups, or possibly gain some fluency in leading a chat room discussion. But that is probably considered to be a good skills set. We maintain that to gain the skills to really teach, using social networking software like Elgg, requires a confidence in negotiating control with learners, letting go and letting the learning take care of itself sometimes, and at other times actively intervening in a way that moulds rather directs the emergent structure. Dron (2006; 2007) considers that tutors do have an important role to play in the learning process. But a change is required in the teacher's role as a facilitator of learning involving a greater awareness of such matters as student group preferences, interests, needs, weaknesses and strengths.

As staff need to be able to work in a new culture, we cannot assume that all students can do that without facilitation. Personal blogging has a key role to play here. In Elgg the variety of privacy modes that can be assigned to any post – from private, through community, to public – enables students to start in private mode and only publish their comments to a smaller or greater community when they are confident. This maps closely onto a mode which exists in Knowledge Forum, when a researcher has a polished paper and can 'publish' that. A personal blog also allows the students to withdraw from the community dialogue and reflect on emerging structures and interventions. The feature in Elgg that allows students to have one personal blog which covers reflections on many community forums is very important, and would facilitate the pattern recognition phase of the connectivist learning model.

Conclusions

This paper has outlined the power of the Elgg social networking software to facilitate powerful forms of learning, knowledge building and innovation, amongst students who increasing acquire the skills set of the participation culture. In reality there are constraints on the level of learning possible. Student psychology and lack of confidence and skills means that they keep much private. Assessment inevitably distorts the learning process by reducing the free-flow of ideas. Students need to maintain ideas as their own property in order to maximise their value. And, assessment places topic boundaries within 'subject areas' which in turn places boundaries on the learning ecology, as well as the requirement to deliver pre-defined learning outcomes. In reality therefore the learning communities in Elgg can only operate in a pragmatic environment but even so, we maintain they can offer an extensive learning opportunity.

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