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The Construction of Social Representations from Collaborative Reflection using Electronic Voting Systems

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Abstract: *Based on the idea of learning as a process of socialization, this study sought to generate representations of student concerns in order to test a particular protocol. The concerns in this case were to do with First Year Experience. The participants were Year 1 and Year 2 students on a UK university Health Science course. The process involved reflective dialogue at small group and plenary level. These discussions were facilitated by the use of electronic voting systems technology (EVS) - one of the few face to face technologies to support large-group interaction and the visualisation of a whole-group perspective. The representations generated in this way can be shared with different stakeholders - including the participating students –as a learning resource. At least 6 representations were generated from the process of collaborative reflection. The process and the range of representations are discussed in readiness for Part 2 of the study to be reported elsewhere in the future.*

Keywords: Collaborative Reflection, Reflective Practice, Social Representations, Clickers, Electronic Voting Systems

**Introduction**  
In order to develop the social self, it is useful to know the range of perspectives that exist within the community on various concerns. Added to this, we need to have some idea of where the consensus lies across that given range of perspectives. Having only one of these – perspectives or consensus - would not give us a full picture of the community view. Having both helps individuals and groups to develop their own view on the matter and would provide a representative view – a social representation (Moscovici, 1998). These representations inform individual and collective development and offer a resource for the community membership. They are generated through interaction with the community and thereby constitute knowledge in the social context (Jovchelovitch, 2007).

Based on the idea of learning as a process of socialization, this study aimed to generate representations of student concerns in order to test a particular protocol. The concerns in this case were to do with First Year Experience. The participants were Year 1 and Year 2 students on a UK university Health Science course. The process involved reflective dialogue at small group and plenary level. These discussions were facilitated by the use of electronic voting systems technology (EVS) - one of the few face to face technologies to support large-group interaction and the visualisation of a whole-group perspective. The representations generated in this way can be shared with different stakeholders - including the participating students.

To set the theoretical context, 3 theories relating to socialization through dialogue and some form of representation are discussed. They are *Communities of Practice*, (Lave and Wenger 1991), *Collaborative Learning* (Bruffee, 1993) and the concept of the *‘generalized other’* (Mead 1934). We begin with an overview of the literature relating to Communities of Practice as a process of socially constructed learning. Communities of Practice are characterised by 3 dimensions below (Wenger, 2007):

*The Domain* – in which there is a shared interest or competence

*The Community* – with whom that interest is shared through activities, information and deepening relationships

*The Practice* – involving the development of a shared repertoire and resources. Resources include experiences, stories and ways of addressing problems.

Central to this is the idea of communities of practice is that people are engaged in progressive levels of participation through activity and conversations about practice. Through conversations, activities and gradual alignment, participants become socialised into the life of the community. Resources, generated by interaction amongst a community, help to develop a community memory and collective identity to which individuals may align.

To ground this exploration of representations in a broader theoretical context, the work of Bruffee (1993) and Mead (Morris, 1934) will be discussed below. Bruffee is chosen because he describes the production of a consensus through conversation amongst collaborative learners. For the purposes of this study, such a consensus (visible or otherwise) can be understood as a representation of that issue for a given group. Mead is chosen because his concept of the ‘generalized other’ can also be seen as a representation of the individual and/or collective. Like Bruffee, Mead’s representation is generated through interaction. In both cases there are strong connections to the concept of Communities of Practice through the idea of conversations, socialisation and representations over time.

Collaborative learning is regarded as a process of ‘*reacculturation’* through conversations (Bruffee 1993). For him, learning is about ‘participation’ in the social world and the social construction of shared meaning (consensus). Through participation in discourse communities, people are learning how to talk about the concerns of the community. They are also learning how to talk to each other about communal matters and they are learning to explain and justify their beliefs – to themselves and to each other. They are situated apprentices learning the tools of the trade (Brown, Collins and Duguid, 1989)

Conversations around concerns support the linguistic induction of ‘apprentices’ in communities of practice. Bruffee describes local sub-communities as ‘transition communities’ that support induction by helping to ‘translate’ the language of the wider knowledge community. The conversations are therefore sense-making activities. To make sense of their concerns, within the context of the knowledge community, participants in these conversations organise their different beliefs into a coherent and communicable form - as a consensual view of that given concern.

In the classroom, students work in small groups to develop local consensus before extending this to the task of achieving consensus at the plenary level. The construction of consensus provides a way of reaching agreement and communicating a view to which the tutor can then respond. Through the social construction of a consensus, the participants in a course begin to make connections from their apprenticed position towards the wider professional body.

The task of collaboratively building a consensus requires a drawing together of the multiple perspectives within the group to create a shared meaning about a given concern (Thompson and Fine, 2009). This *integrative complexity* is something difficult to achieve but highly effective as a learning process. This is particularly so in terms of differentiation and integration when compared to individual approaches (Gruenfeld and Hollingshead, 1993). The creation of a shared meaning can function as a social artefact and thereby providing a link and a contribution to the knowledge-community beyond.

Turning to Mead (Morris, 1934), the socialisation of learners is also achieved through conversations within the community. Mead states that we are able to imagine the perspective of others evidenced in the way we prepare for any interaction. We prepare to talk with others in a way we perceive to be appropriate – achieved through taking the role of others to acquire their perspective. This means *appropriate* in terms of content, tone, linguistic level and/or relevance. We learn to ‘pitch’ our speech at the level perceived to be appropriate to our needs and our perception of how the other person will receive our expression. In this way, we develop an expectation of others from our interactions.

The imagining of the other person’s perspective is a process that constructs a ‘generalized other’ (Mead, 1934) – a sense of views distinct from our own. Individuals may be viewed as representative (significant other) of the ‘generalized other’ and thereby inform the development of the conception of the collective. It is through anticipation and interaction that we refine our sense of the group and individuals into a ‘generalized other’ to which we may align ourselves– a process referred to as ‘tuning.’ Once a person is able to ‘tune-in’ and accurately predict the response of others, before and during interaction, then they are deemed to be full members of the professional community.

From this brief overview of the work of Bruffee and Mead, we are able to deduce how both theorists might inform our understanding of social representation. Consensus can be understood as a representation held *by* the group. The ‘generalised other’ may be broadly understood as a representation *of* the group. Both representations are in a reciprocal dynamic relationship to each other. Both are generated through discussion (internal and external) of interests and concerns. The ‘generalised other’ can also be held by a group as well as an individual. Wagner (Wagner, 1998) also suggests that the discussion of an object (including events, ideas etc) *creates* the social object for the group concerned. There is a relationship between the so-called real object, those discussing it and the social construction of that object in the language of the group discussion.

A number of questions arise at this point. For example, how representative of those involved is a given consensus? Was the constructive process one of full and democratic participation in the construction of the consensus? What proportion of those present shared the views expressed and the form of its communication? To what extent was the arrival at the given consensus altered through mediation? There are many issues around any discussion of a group-perspective in terms of process, participation and representation. The idea of any kind of group-perspective is problematic. For instance, we could define such products as:

“….*perspectives that are held in common by members of a group. Group perspectives are modes of thought and action developed by a group that faces the same problematic situation. They are customary ways members of a group think about such situations and act in them. They are the ways of thinking and acting which appear to group members as the natural and legitimate ones to use in such situations*” (Becker et al, 1961; pp.36).

This conception of group-perspectives suggests a possible ambiguity or distinction between group-perspectives versus group activity and group-perspectives on individual action. In this sense, talk of a group of people facing the same situation may not mean that they do so together – not necessarily a team-task. It may be students on individual placements for example. In such a case the group ‘shares’ the placement activity as part of a course but each may have a different location and experience.

The extent to which the meaning is shared is also an issue. Thompson and Fine (2009) offer 3 categories of meaning being shared:

1. Shared meaning ‘divided into portions’
2. Shared meaning as something ‘experienced’ or ‘held in common ground’
3. Shared meaning as ‘partaking in agreement’

Space does not allow deeper discussion of the shared meaning of co-constructed representations. Suffice it to say that the problematic nature of social representation as a shared process or product is acknowledged. In recognition of the ambiguities relating to group-perspectives and the notion of sharedness, the goal of this study is to build social representations that reflect *collective plurality* (Harre, 1984). Perhaps more elegantly, Parker (1987) quotes the work of Moscovici saying that ‘*social representations*’ represent the ‘*community of meanings*’ that make up the ‘*consensual universe*.’ In this way a social representation, in this study, will be understood as a group-conception of an issue created by those involved at a given point in time.

From the discussion above, we would think that if experience, as an object, is socially constructed then it would follow that 2 different cohorts might reasonably construct quite different representations of the same first year of a course. They are different people with different experience that may have different dialogue and concerns. Equally they might construct some of their experience in a similar manner because the formal provision of the first year of the course is largely the same for two neighbouring generations. How similar or different might the year-group representations if we were able to construct a view of them? To explore this in more depth, the issue then becomes how to generate these representations and how to design a process of collaborative reflection.

**Research Context**

This study is conceptualised in 2 parts, the first of which aims to design and test a *process* for facilitating group interaction and to construct group-perspectives as social representations. Also, in this first part of the study, the further goal of identifying the range of representations achievable through the application of the given process is considered. Part 2 of the study, to be reported elsewhere in the future, will build upon this to explore the process in more depth and specifically to look at the impact, upon different stakeholders, of the representations generated. This will inform an additional aim of understanding the utility value of the process and outcomes.

The study reported here represents part 1 of an inter-disciplinary project concerned with ‘technology and discussion.’ This project is based at the University of Glasgow where a body of expertise exists, across several departments, around the use of EVS. This technology is becoming more popular not least because it is one of the few vehicles for supporting interaction in large face-to-face groups. Previously, a show of hands would be used to canvas opinion. With EVS, questions are typically posed to a group of students who vote on one of a number of available options. The results are displayed to everyone in the room. The tutor is then able to respond accordingly and to assess the students and their development.

There are a range of applications emerging for this technology as research develops. Draper (2009) provides a useful classification of different applications. The reader may also like to see Caldwell (Caldwell, 2007) for a more detailed discussion of the current literature. One of the more interesting strands in the EVS literature has to do with peer-learning. It is broadly within this strand of the literature on EVS that this study broadly belongs. The two most popular approaches to peer-learning with this technology are Mazur’s (Crouch & Mazur, 2001) Peer Instruction (vote-discuss-vote again) and Dufresne’s (Beatty et al, 2006) Class-wide Discussion (voting as a pair - sample group explain their vote to the class- class discussion begins). These models are centred upon peer-discussion of questions posed by tutors and they are both concerned with the study of individual learning as a consequence of these peer-processes. However, this article differs in that it has a focus upon the construction of representations and learning as a group.

One of the challenges in the use of this technology is the issue of creating questions. This is seen as vital to the success and value of deploying EVS technology. The phrasing and pitch of the question has a significant influence on the response and the outcomes of the activity (Beatty et al, 2006). The work of King (1998) stands out in the literature, showing the issues and benefits of having students generate questions and answer them together. This is termed as ‘peer-mediated learning’ representing a collaborative process that requires explanation and justification to each participant. The learners scaffold each other and they collaboratively create new knowledge through a process of elaboration. King (1998) regards this as effective in the development of high-order thinking.

On the basis of the mental effort implied in peer-mediated learning, this study invited the students to co-construct the questions and the optional answers relating to their shared concerns. In the literature, the usual aim of having students author questions is to support individual learning. The present study differs in that it describes a process of creating questions and options as part of a process that collaboratively constructs a group product. This study is interested in the learning of a group. It looks at representations as a group product of a group process. The possible impact of the group product on individual is important but so too is the idea of collective thinking (social cognition).

**Research Methods**

For this study, a pilot was carried out in a Health Sciences department with Year 1 and Year 2 students of the same course. These students were based in a university in the North of England. The sample was chosen for reasons of convenience and opportunity. The students were available and interested to participate in the project.

This study sought to assess the possibility of:

1. supporting collaborative reflection upon individual and shared experience(s)
2. generating a shared representation of the collective concerns around experience(s)
3. generating a view of the distribution of the concerns within a group
4. Identifying the variety of representations that might become available from this process

This is in preparation for Part 2 of the study to then be able to:

1. Evaluate the effect upon participants of viewing the range of concerns
2. Evaluate the effect upon participants of viewing the distribution of those concerns
3. Evaluate the utility of the representations for different stakeholders (students, staff, support services etc.)

A case study approach (Yin, 2003) has been adopted for this study. This will be a case study of the use of EVS technology to support the construction and use of group representations in support of socialisation. These perspectives are generated from reflective student dialogue around concerns which relate either to a given topic or a particular shared experience. This is a mixed method approach to research in an interdisciplinary study. The disciplines involved in the project are education, computing science and psychology. The quantitative data includes the range of concerns and the distribution of votes across those given concerns. This data will be captured largely through the use of EVS technology. The qualitative data involves interviews with tutors and students.

To address the goals of Part 1 of the study, we developed a discussion protocol with a past, present and future structure. The protocol for use with the technology is shown below and was used most effectively in a 2 hour time frame.

**Discussion Protocol – with technology**

1. Introduction to session & plan
2. Distribute & complete questionnaire
3. Small group discussion on initial concerns at start of year 1
4. Create an EVS question from list
5. Vote on main concern
6. Small group discussion on solutions to be recorded on a blank sheet of paper and handed in after feedback to class
7. Re-present first question and ask which of these concerns remain in year 2
8. Ask for any additional concerns in year 2 plus any possible solutions or sources of support that may seem appropriate to be discussed in small groups and recorded on a sheet of paper to be handed in after feedback
9. To show development, present results of vote 1 & 2 on 1 slide
10. Request volunteers to run a similar session to year 1students
11. Thanks & close

To carry out the study, 3 sessions were organised in the sequence below:

1. Year 2 students using the protocol and the EVS technology.

This session reviewed the first year concerns, those concerns that remained in the present moment, and future concerns for the year ahead. The session lasted 2 hours and used the voting technology.

2. Year 1 students using only the protocol and voting with a show of hands.

This session reviewed concerns on arrival and concerns for the year ahead. This session lasted about 1 hour and did not use the technology. Votes were recorded for each option in turn and then manually added to a PowerPoint slide.

3. Cross-Year Session - A sub-set of Year 2 students with a sub-set of Year 1 students using the EVS technology

A sub-set of Year 2 students volunteered to mentor a group of Year 1 students. This session lasted 1 hour and used the voting technology. This session was also evaluated with Year 1 students using the technology.

For each of the first 2 sessions a questionnaire was handed out for completion and immediate collection. The questionnaire was anonymous and asked students to identify the issue that concerned them and the reason why that was of most concern.

Interviews were carried out with 2 tutors on the course to gather their perceptions of the concerns that existed within the student body. We also used the interviews as an opportunity to gather background data about the course and the student profile. Information was also gathered regarding the provision of learning support and the apparent support needs of students across different years of the course

**Analysis**

The aim of this stage of the study is to assess the ability to generate group representations from reflective conversations. What is the variety of such perspectives that might be achieved? This was tested with and without technology using the same protocol.

We have so far identified at least 6 different whole-year representations.

1. First Year Experience – Before (Yr.1 Starters) and After (Yr.2 Starters)
2. First Year Experience – Before and After for the same cohort
3. First Year Experience – Concerns Common to both cohorts
4. Concerns Across 2 Years of a Course for the same cohort
5. Impact of Cross-Year Dialogue on Yr.1 Group for Specific Concerns
6. Impact of Cross-Year Dialogue on Yr.1 Group for Whole Session

We review these 6 representations below and provide examples. We also distinguish between primary and secondary group representations. Primary group representations are those generated by group reflection on the issue under consideration. Secondary group representations are hybrids of different primary representations in which the results from more than 1 vote are brought together.

TABLE 1: Representation No.1: First Year Experience – Before (Yr.1 Starters) and After (Yr.2 Starters)

|  |  |  |  |
| --- | --- | --- | --- |
| **Year 1 Students Concerns Before Starting** | **Vote (with Show of Hands)** | **Year 2 Students Concerns** | **Vote (with EVS)** |
| Keeping up to date with work | 6 | Domestic Skills | 0 |
| Coping with work-life balance | 0 | Being Undressed | 0 |
| Finance | 0 | Balancing Study and Life | 8 |
| Failing | 0 | Managing Money | 3 |
| Coping with new situations | 0 | Living with Illness | 0 |
| Meeting the standard required | 8 | Unclear  Workload | 2 |
| Assignments making sure they’re right | 9 | Friends | 14 |

This is a secondary representation. It shows combined voting from the separate 1st Year and 2nd Year sessions. The total contact-time needed to generate these 2 primary representations was approximately 3 hours (Year 1 session = 1 hour, Year 2 session = 2 hours). Year 2 voting results are derived from 100% participation conducted as a single vote. Year 1 voting results shows a total of 23 votes counted from 37 participants. In addition a separate count was needed for each vote. This meant 7 votes using a show of hands for each option.

TABLE 2: Representation No.2: First Year Experience – Before and after for the same cohort

|  |  |  |
| --- | --- | --- |
| Concerns | Concerns in  Year 1 | Concerns Remaining  in Year 2 |
| Domestic Skills | 0 | 2 |
| Being Undressed | 0 | 1 |
| Balancing Study and Life | 8 | 12 |
| Managing Money | 3 | 8 |
| Living with Illness | 0 | 1 |
| Unclear  Workload | 2 | 2 |
| Friends | 14 | 1 |

The above table shows a secondary representation. It was generated and shared within the live session with Year 2 students. It was used to display the changing profile of their concerns as a group over a 12 month period. The 2 primary representations were copied and pasted onto a single slide. This allowed the tutors to highlight the change from social concerns to study-related concerns. Using this secondary representation, the tutors congratulated the students on making this journey as a group. This was the first time they had been able to generate and share a representation of their experience in such a visual manner.

TABLE 3: Representation No.3: First Year Experience – Concerns Common to both cohorts

|  |
| --- |
| Concerns Common to both cohorts |
| * Workload Issues * Money Problems * Overcoming the Newness of University * Study-Life Balance |

This secondary representation was constructed from combining the Year 1 primary representation with the Year 2 representation. This secondary representation constitutes the ‘common ground’ of 4 shared concerns. The ability to construct this common ground later provided a structure for the 3rd session of this study - between the 2 different year groups.

TABLE 4: Representation No.4: Concerns Across 2 Years of a Course for the same cohort

Pressures of time and a wish to avoid too much repetitive activity meant that only 2 votes were taken in this session (hence 5 columns rather than 6 in the table below). For both votes there was 100% participation with all 27 participants voting each time.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Year 2 Students Initial Concerns | Votes | Year 2 Students Current Concerns | Votes | Year 2 Students  Future Concerns |
| Domestic Skills | 0 | Domestic Skills | 2 | Different Levels of Work & Workload |
| Being Undressed | 0 | Being Undressed | 1 | Placements |
| Balancing Study and Life | 8 | Balancing Study and Life | 12 | Money |
| Managing Money | 3 | Managing Money | 8 | Work Life Balance |
| Living with Illness | 0 | Living with  Illness | 1 | Friends |
| Unclear  Workload | 2 | Unclear  Workload | 2 | Assessment & Grade Achievement |
| Friends | 14 | Friends | 1 | Transport |
|  |  |  |  | Accommodation |
|  |  |  |  | Short Module |

This secondary representation shows the changing profile of concerns in a group across a 2 year period. This includes the information in representation No.2 above. To this is added a projection of future concerns held by this year-group. This 2 year view shows how collaborative reflection upon the shared past, present and future concerns could generate a unique representation.

TABLE 5: Representation No.5: Impact of Cross-Year Dialogue on Yr.1 Group for Specific Concerns

|  |  |  |
| --- | --- | --- |
| Question: What do you think is the best strategy to overcome the ‘Newness’ of University? | Vote 1 | Vote 2 |
| Explore Town | 0% | 0% |
| Join Societies | 22% | 45% |
| All in the Same Boat | 78% | 33% |
| Meet People | 0% | 22% |

This secondary representation was generated in the 3rd session. Students from Years 1 and 2 worked together on the issues that constituted their common ground. A similar primary and secondary-group representation was generated for each of the 4 concerns discussed by participants. In this session, the voting technology was used and again this resulted in 100% participation in the voting.

In this session, the Year 1 students voted on a given concern and then the results were shared on the screen. This representation was used by Year 2 volunteers to respond. Once all 4 issues had been discussed a second vote was carried out on all 4 concerns in quick succession. For each issue a representation was generated and shared with everyone in the room. This allowed further comment and observation. In each case, the profile of the group-vote changed between vote 1 and vote 2.

TABLE 6: Representation No.6: Impact of Cross-Year Dialogue on Yr.1 Group for Whole Session

Evaluation: What would you like to see next?

|  |  |
| --- | --- |
| Options | Vote |
| More but no technology | 0% |
| More Sessions | 56% |
| Enough Thanks | 22% |
| Regular Sessions | 22% |

This is a primary representation. It shows that the Year 1 participants were interested in further sessions. There was also some interest in more than one additional session. The technology used resulted in 100% participation in the voting. This indicates a representative evaluation of the session by those involved. The vote also creates another perspective on the main part of the session.

Discussion

The aim of Part 1 of this study was to identify a process for generating representations from reflective conversations. The review of this phase shows that this has been achieved. This involved the design of a process that included a discussion protocol. The protocol was effective in eliciting concerns across a group at different periods of time. The structure supported collaborative reflection in small groups and plenary discussion formats. The protocol alone was not however able to produce a view of the distribution of the concerns across the group. The design also included the use of voting technology. Whenever this was used it delivered 100% participation in every vote. It also showed the distribution of concerns across the group. In addition, it created primary and secondary representations many of which were shared within the session in which they were developed.

The other aim of Part 1 of this study was to identify the range of representations achievable using this process. The approach used here created primary representations at different points in time (Year 2 session). It also generated similar representations of before and after a discussion (session 3). Further primary representations were created for group evaluation of cross-year interaction. The combined use of the protocol and voting technology also supported the creation of secondary representations. These were hybrid representations created by combining one group-vote with another. It was very often possible to create and share these secondary representations in the same session.

These secondary representations could support further dialogue amongst peers (session 3). They could also support additional input by tutors (Year 2 session). The creation of these secondary representations created a view that was hard - if not impossible - to achieve in any other way. It was also difficult to achieve a similar group-perspective that was as representative in terms of participation. Likewise it would be difficult to produce a complete visualisation from reflective conversation at different levels in any other way within a 2 hour face to face session. The secondary representations facilitated additional dialogue. These same representations also supported the construction of ‘common ground’ amongst 2 cohorts of students on the same course. In this way, these single-year representations functioned as learning resources that supported further dialogue across the different generations of the course. Voting by show of hands meant results were incomplete and there was disruption to the flow of conversation. It was not therefore possible to generate secondary representations without the technology.

These various representations also potentially support the work of tutors and researchers in the community. Participants are also partners in the research. The participants generate the data and see the initial analysis in real-time. As such the process and outcomes must surely have validity in the minds of participants. This validity and the implicit trust in those outcomes may be an important factor in the possible socialising effect of these representations. In this respect, the research outcomes are much less mediated and any future analysis is tested by the representations generated and witnessed by participants.

There are a range of questions that come out of Part 1 of this study. To what extent do individuals internalise or align to the representations? Does this process construct a sense of group-knowledge and/or a sense of the community? How might these social representations be used across the academic and professional community to support further dialogue and new perspectives? Part 2 of this study seeks to replicate the initial work done in Part 1 and to extend the research to explore the impact and wider utility of these representations for all stakeholders in the community. This will be reported elsewhere in the future.

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