THE USE OF WIKIS FOR ASSESSING COLLABORATIVE LEARNER ACHIEVEMENT

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Abstract

This paper seeks to examine the potential for wikis in assessing learner achievement. There is a widespread recognition that groupwork is a beneficial method of learning, and that assessment is a key driver in determining the learning methods that are employed (e.g. Scouler, 1998; Black and William, 1998). Examining the processes of assessing groupwork and the potential that new technology can bring to this is essential to expanding its use. One new technology, which can be used to assess groupwork, is a wiki – an editable webpage which can track the comments made, plus any discussion which goes on behind the scenes, and log the time/date of contributions.

This paper reminds the reader why groupwork is such an essential part of student learning, how it is crucial that this is appropriately assessed, how the assessment of collaborative student achievement has been attempted in the past and the ways in which emerging technology - with a particular emphasis on wikis - can enable the assessment of a process which has thus far been hidden without high intervention strategies.

The SQA is currently considering giving candidates on Project Based National Courses (PBNCs) access to a wiki for recording and presenting their group achievements – recognising this as a medium which encourages group-working and allows demonstration of skills in a manner which encourages collaboration and conflict resolution.

The importance of assessing collaborative student achievement

People have for years been exploring ways of bringing teamwork to learning through the promotion of groupwork, and examining methods of assessing groupwork in order to promote a desirable backwash effect (Wolf et al., 1991). Anecdotal evidence suggests that while learning through groupwork and evaluation through group assessment are common in Primary schools, this trend tapers in Secondary, and virtually disappears in the latter years of Secondary school. The phenomenon of groupwork transition between primary and secondary schools is now part of a new research study examining how the beneficial effects of groupwork can be sustained within the secondary curriculum (Groupwork Transition Project, 2006). Much of this is due to the difficulties of awarding individual awards on the basis of work which has been done on a collaborative basis, however there is no evidence that the

need for students to learn the essentials of teamwork diminish, in fact if anything these skills grow more important as employment gets closer (QCA, 2004).

This issue has been recognised for many years, and there has been a trend to reward team-working, in particular through the "working with others" Core Skill[1], which runs throughout the curriculum from Level A[2] of the Scottish 5-14 curricular framework through the National Qualifications curricular framework and on to Higher Education. This primarily embedded skill is assessed through the evaluation of competences where the student is required to demonstrate good team-working attributes which can be observed by others, or to produce material which demonstrates that they understand the principles of good teamwork (SQA, 2003).

Unfortunately, many of these assessments are artificial – they are either assessing the behaviour but not the output, or the output but not the behaviour. However the critical factor of team-working, or group-working is to behave in a manner which boosts the performance of the overall team – something which cannot be assessed unless the output and the behaviour are assessed in tandem. This has always been a very difficult balance to achieve. As Bennett and Cass (1988) point out there is a tendency to evaluate that which is easily measurable, and as much of the evidence of these skills are hidden within the micro-interactions of the participants hence it is difficult to gather objective evidence of achievement.

Key Features in the Assessment of Collaborative Achievement

Three features are important to consider when designing a new assessment: its validity; its reliability and the washback effect that it will have. A valid assessment is one which measures that which it purports to measure (McAlpine, 2001); validity is generally separated out into three elements of construct validity; content validity and predictive validity. A reliable assessment is one in which the same results are gained time after time (McAlpine, 2001), and is generally measured using either parallel tests or repeat tests and noting the correlation between them. The washback effect is designed to "*induc[e] in the education system the changes that foster [the] skills that the test is designed to measure*" (Fredrickson and Collins, 1989), ensuring that the assessment promotes desirable learning methods.

To ensure validity, it is essential to pay heed to its three constituent components: construct, content and predictive validity. To ensure construct validity, it is essential that defined learning outcomes that are being assessed correspond to the underlying traits, knowledge or skills which comprise the domain of learning. Where a skill which is designed to be learned is the ability to work collaboratively effectively, or produce collaborative outputs, ensuring construct validity means ensuring that these are defined as assessable

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[1] 'key skill' in England and Wales
[2] Key Stage 1 in England and Wales

learning outcomes for the task. To ensure content validity, it is crucial that the assessed outcomes correspond to the learning objectives of the task. Where the learning objectives include working in teams, or the participation in group tasks or the production of collaborative work, it is essential that these are directly assessed. To ensure predictive validity for future success in applying the learning it is important that the assessment is situated in such an environment. Where the learning applied is likely to be done in groups, assessment in the context of those groups is advantageous.

Reliability is crucial in ensuring a high quality assessment; however, this has always been the stumbling block of groupwork assessment. There are various methods in use to assess groupwork, however there is a perception that they are overly subjective and that it is difficult to apply consistent criteria to phenomena which are by essence ephemeral. Although communities of practice (Wenger, 1999) can reduce the subjective and promote common understanding to some extent this is a major challenge for assessing collaborative achievement. Some of the challenges involved in groupwork assessment are covered below, such as the freeloader, social loafing and proximal development effects, which pose particular challenges to reliability.

The methods used to assess collaborative achievement need to be evaluated with respect to the types of learning and student behaviours which they promote. There also needs to be evaluation of to what extent a piece of learning or assessment is truly collaborative – respecting and highlighting individual group members abilities and contributions, and to what extent it is purely co-operative, where the learning/assessment is structured to facilitate interaction, but there is no requirement to involve and respect all group members. (Panitz, 1996).   Direct assessment of collaborative student achievement will promote such working and learning styles, however there may be unintended consequences – students may feel obliged to be more extroverted than they would naturally be, or nervous of making tentative suggestions in fear of being marked down. As with Schrödinger's cat, the act of observing changes that which is observed, and these changes must be monitored to ensure that the effects are desirable.

Issues in using Groupwork in Assessed Learning

Oxford Brookes University (2002) identifies five advantages of using groupwork,

- that students can develop skills of collaboration and team-working;
- group work can allow students to undertake a greater variety of assignments;
- group work can allow students greater say in what tasks they do;
- students get to know each other, and form working relationships which have benefits beyond the particular group assignment work;
- work done in groups can be more real than work done by a large class,

…while James et al. (2002) note the educational benefits that groupwork brings, but stress that the design of its assessment is crucial to its success.

There are a number of guides of how to design groupwork to elicit the best from participating students (e.g. Davis, 1993; Issacs 2002, Connory, 1988, Watkins, 2005), which have a number of common themes running throughout. The most notable of these are the recommendations that there should be a clear definition of group membership, and the roles and responsibilities within it; that the tasks which the group are being asked to tackle require a level of interdependence from the participants and that the evaluation of achievement is pre-determined and explicit.

There are nonetheless issues associated with the use of groupwork. Perhaps the most commonly identified is the freeloader problem (Kerr and Brun, 1983) – the question of how to assess individuals who make no contribution to the group effort within an assessed group scenario. Issacs, 2002 suggests three strategies to overcome the freeloader problem, however cautions that distinction between situational freeloading (where less able members of the group are unable to contribute) and deliberate freeloading must be made. A closely related issue is that of motivation loss which it is estimated accounts for over half the perceived problems with group work (Morgan, 2002). One possible explanation of this is that those underachieving indulge in social loafing, allowing higher ability or more conscientious group members to shoulder the majority of the work (Kerr, 1983). However, the alternative explanation offered by Dembo and McAuliffe (1987) is that higher ability individuals within a group take charge to reinforce their status, effectively sidelining the rest of the team.

There are also issues around the structuring of the ability range of groups. Vygotski (1978) talked of the "Zone of Proximal Development" as a space in which a learner could perform a task, only if they were given appropriate support at a slightly higher level of ability than they would be able to achieve themselves. However, this may have the effect of advantaging lower ability students, depressing discrimination and consequently reliability. Webb et al (1997) has demonstrated that the assessed performance of lower achievers was raised when in a group with others of higher ability compared with in a homogenous group - although the same phenomena was not found with higher achievers (Dembo and McAulffie, 1987), raising the question of whether it is possible to assess a student independently of the group in which they find themselves.

Traditional methods of groupwork assessment

There are a variety of ways in which groupwork is currently assessed without technological assistance. Chin and Overton (2005) mention individual reports; group reports; observations and interviews; group presentations; poster presentations; peer assessment of contribution to group and individual exercises (although they caution that this last one goes against the ethos of group work). From these, the most popular direct assessment methods of

collaborative working are however group reports, observations and peer assessment of contribution.

Assessment of the products of groupwork in the form of group reports or presentations is one of the most popular assessment forms. The major problem with this approach is ensuring that people are adequately rewarded for their achievements, in a situation where the process is hidden and (in a successful project) where the roles and authorships of the group participants are obscured.

Issacs (2002) suggests a number of different marking approaches which are implemented in assessing the products of groupwork – he notes different approaches to the distribution of marks including shared group mark; individual mark for an allocated task within the project; student distribution of pool of marks and students allocating individual weightings as popular forms of mark allocation. A shared group-mark is probably the easiest form of marking however it is commonly believed to be unfair due to the freeloader problem (see above) – although can be justified if these are frequent small group tasks so individuals are being assessed a number of times. Individual marks for an allocated task may allow for individual differentiation, but is unlikely to promote group cohesiveness and may be biased according to the task that the student has been allocated. Student distributions and allocations of weightings may be perceived as fair by the students, however require a deal of skill which may not be present and can have undesirable social effects, while peer evaluation can reflect more the social interactions in the group than genuine contribution or achievement.

Groupwork is frequently assessed through observations, either informally or through pre-prepared checklists. Less frequently video is used to capture the group members' behaviour and reflected on later to evaluate their contributions. Although observation is common, it is normally used only for formative and reflective. Observation is sometimes accorded some summative weight based observational checklists, however even on video the reliability of the assessment is low as it is difficult to capture all of the interpersonal interactions that will be happening simultaneously within even a small group.

There are a variety of ways in which the peer assessment of contribution approach can be implemented (see Issacs 2002 for some examples); however the key feature is that some marks are allocated to the group for distribution among the members on their own perceptions of contribution. This has the advantage of facilitating the assessment by those who were actually involved in the development process, and as such have a privileged perspective on which members made what contributions. Caution must be noted though that in the absence of guidance on what is to be rewarded, group members may not always be consistent or valid in their marking. Furthermore, the marking may be swayed by the individual dynamics which operated within the group. However, Race (2001) suggests that the individual dynamics which come into play become one of the major advantages of feed back - suggesting that students giving feedback on an ongoing basis in the

course of the groupwork can compensate for the difficulties that tutors find in giving appropriate and learner centred feedback.

Beyond assessing the products of groupwork however, there is a desire to assess the "softer" skills of teamwork and problem solving. Materials have been developed by Learning and Teaching Scotland (LTS, 2005) to directly enhance these; although by their nature these are situated skills which require a context to function, thus it makes more sense to develop and assess them within that context. Indeed this is exactly the kind of approach which is encouraged within the 5-14 framework and National Qualifications framework (SQA, 1999).

Assessment of teamwork

Process is an integral part of groupwork, but it can be very difficult to assess. The core skill "working with others" occurs throughout the UK curriculum from Level A of the 5-14 curriculum through to Higher Education. Van Der Zanden (2005) has completed a short review of the main methods of assessment used for this Core/Key skill by the awarding bodies of the UK. It would seem that although awarding bodies settle on a consistent model of Internal assessment and quality assurance supported by external moderation, there is some variation in the types of evidence which candidates are required to produce.

Table 1: Evidence requirements for "working with others" key/core skill

	SQA	AQA	Edexcel	OCR	WJEC
Candidate Evidence *E.g. the candidate writing a statement about how they performed in the group*	Yes	Yes	Yes	Yes	Yes
Tutor Evidence *E.g. the teacher writing a statement about how the candidate performed in the group*	Yes	Yes	Yes	Yes	Yes
Peer Evidence *E.g. the other group members writing a statement about how the candidate performed in the group*	Possible	Yes	No	Yes	No
Objective Evidence *E.g. video/audio presentation/folder of work which is kept and presented as evidence*	Yes	Yes	Yes	Yes	No
Interrogative Evidence *E.g. Responses to written questions/oral questioning by an assessor*	Yes	No	Yes	Yes	Yes

(Table adapted from Van Der Zanden, 2005)

As can be seen, the most popular forms of evidence are candidate and teacher created, with peer created evidence much less emphasised. Although centre support material is provided for the working with others core/key skill, it is not clear how much consensus and consistent application there is of the criteria, particularly where the candidate might be less skilled at reflecting on their skills.

Introducing Technology into Groupwork assessment

Collaborative learning is nothing new, and can indeed be traced back to the late 18th century, being employed at the University of Glasgow for philosophy teaching (Gaillet, 1994) however what is new is the technology which can be employed to support the process. Access to virtual learning environments, both for staff and students has greatly increased over the last two years (Jenkins et al., 2005). With 81% of institutions using it for collaborative working, it is the third most popular use made of the medium behind only access to course materials (98%) and access to web based resources (90%).

One of the first uses of web-based technology to enable groupwork was its use in online collaborative communication environments. The OTIS Project

(Higginson, 2002) compiled a collection of case studies from people using online collaborative learning environments, a number of whom used them for assessment purposes (McAlpine and Higginson, 2002).

Some of the findings from assessing the online groupwork mirrored that of groupwork practise in off-line environments. Anderson and Simpson, 2005, for example found that

> *"A strong ethic of group responsibility was developed - most online tasks were group tasks that required each person to undertake some part of a task that groups had to report on. "*

<div align="right">(Anderson and Simpson, 2002)</div>

This mirrors the work of Issacs, Watkins and others, who suggested that a key requirement of successful groupwork was the interdependent nature of tasks which ensured that group members were forced to work together.

One of the major strengths of an online collaborative environment is its transparency. As everything is recorded centrally, it can all be assessed. It should be noted however, that although interpersonal interactions occur within the medium as well, these are not directly equivalent to face-to-face communication. Graham and Misanchuk (2004) highlight the need for active facilitation of the group in an online collaborative environment as a key determinant of its success. . This aspect was noted by MacDonald (2002) and McKenzie (2002) as a major incentive to participation in an online learning environment. Student evaluation questionnaires revealed that although there was initially resistance to the assessment of online team working (McKenzie, 2005), it did provide an incentive to participation, drawing in the shyer members of the group and guaranteeing the involvement of all students (McDonald, 2002).

It was also found that within an online learning environment, when students felt under pressure from the need to complete assignments, they lessened their participation in the online discussions. The transparency of the system made this immediately apparent so that the balance of the assessment could be adjusted, creating a favourable washback effect (Anderson and Simpson, 2002)

How wikis can improve groupwork assessment

A wiki is a type of website which allows readers/users to add and edit content and is especially suited to collaborative authoring. There are a variety of software systems available in which to create a wiki, as well as a number of popular and well used wikis freely available over the web – the best known being wikipedia– an online editable encyclopedia, part of the WikiMedia foundation.

In essence it is a simplification of the process of creating HTML pages combined with a system that records each individual change that occurs over

time, so that at any time, a page can be reverted to any of its previous states. A wiki system may also provide various tools that allow the user community to easily monitor the constantly changing state of the wiki and discuss the issues that emerge in trying to achieve a consensus about the wiki content

In terms of what the user sees, this varies from wiki to wiki, some more sophisticated wikis make more of the system available to the ordinary user, while others only have this functionality available to a power user.

Wikis are in essence a collection of documents which can be developed collaboratively by a number of authors. As multimedia may be embedded within the pages, the document is not restricted to text, but can also hold images, audio, video and animation. Rather than a group submitting a project on paper with supporting materials, a wiki could be used as both a working and presentation environment, allowing a narrative to be weaved around the embedded artefacts. Additionally, the use of wikis can overcome a variety of other issues which have been identified in the literature on groupwork.

Difficulty with tying individual contributions into a "coherent whole"

Traditional groupwork submissions are frequently a disparate collection of artefacts created by different people and put together as the group submission (James et al., 2002). Most successful examples of groupwork involve tasks which require interdependence of the participants, so that one participant cannot perform unless others, (Issac, 2002). In a wiki this becomes a part of the natural method of working: although it would be possible to divide up the wiki to allow people separate spaces within it, this would have to be an explicit decision, and one against the ethos of the project and the default set up of the software, rather than a natural way of working in the environment. Thus the environment itself encourages the good practice which the educator is trying to develop in the learners.

Risk that a subgroup may take over the project

Dembo and McAuliffe (1987) identified that there was a danger that a subgroup of confident and well-integrated members may take over a project, either deliberately or by default as the other members feel less engaged and/or less able to tackle their monopolisation. This can be overcome by defining an explicit space for dissent to be recorded and acknowledged, for differences of opinion to be aired and resolved. In traditional groupwork, this may consist of set aside time devoted to this purpose, such circle time, however frequently this is neglected as an irrelevance or a timewaster, particularly where dissent is being expressed. The discussion pages of the wiki can make for this explicit space – where issues surrounding the project can be discussed openly, but without the accusations of taking time away from the project. This will also record any group-member who is feeling unable to contribute and the reasons underlying it.

Group members may freeload

A commonly identified problem within groupwork is that group members may "freeload" – taking credit for the groups' achievement while they themselves contributed little to it. The collaborative nature of the environment can encourage co-operation within the team members, where everyone can see the joint effort – both in terms of products and also in terms of what each of the members is contributing, making it less easy for someone to "freeload" on the back of other peoples work. If group members do attempt indulge in freeloading, the allocation of marks can reflect this as evidenced through their contribution via the history and discussion pages, so they would not be benefiting from other work. The History page can be used to explore the contribution of each of the group members to the overall, allowing a means of observing the contribution that each of the members has made to the overall product unobtrusively, while the discussion page can shed light on any controversies or differences in view that the group members have had in the development of the project.

Resolving a freeloading issue without destroying group cohesion

One of the difficulties that groups which are suffering from a freeloading problem experience is how to resolve the issue without it destroying the cohesion of the group (James et al., 2002). As mentioned above the collaborative nature of the environment makes it less easy for someone to "freeload" in the first place as the contribution of each of the team members is more visible. If group members do indulge in freeloading, the allocation of marks can reflect this, as evidenced through their contribution via the history and discussion pages. The History page can be used to explore the contribution of each group member to the overall, allowing a means of observing unobtrusively the contribution that each member has made to the overall product; while the discussion page can shed light on any controversies or differences in view that the group members have had in the development of the project.

Instant yet Subtle feedback

Students, particularly at the age at which they attempt school leaving examinations, tend to be self-conscious about both teachers' and peers' views of them. This may be a contributory factor to the freeloader/social loafing issues discussed earlier. Hara (1998) talks about the frustration that students experience with online distance learning, in particular, the lack of immediate feedback in the absence of direct interaction with the supervisor. Also, the impersonal nature of the student/tutor relationship tended to make it difficult to follow subtle cues, making students nervous that they were not submitting that which was expected.

Benfield, 2000, has commented also that in terms of threaded discussion lists…

> *"...because online comments are written, they tend to be invested with gravity greater than is the case with normal speech. If you 'say' something 'silly' online, it will stay there, for all to see, for everyone to reflect on. And you are reminded of it every time you visit that discussion area... Others may find that the time they get to reflect and compose their comments invests them with a power they don't ordinarily feel in face-to-face communication..."*

(Benfield, 2000)

With a wiki, the feedback provided is relatively quick, but also subtle – if someone feels that you have made a positive contribution, it will be built on, if it was not so helpful, it will eventually be edited out as others improve and develop the document. As the author of a part of the document is not immediately apparent (although available from the history), there is less inhibition about deleting or changing someone's work as it is already integrated into the body, compared to taking out a section that a group member has written which is clearly identifiable as their work.

Additional means of Authentication

 A further issue which is frequently raised in the assessment of groupwork is the difficulty in determining who has contributed what. The best methods of authentication of group members' work – labelling the artefacts which they produced – is the least likely to promote an integrated, collaborative product. In a wiki however, this need to explicitly label and claim is sidestepped by the automatic logging inherent in the system. Of course there are still issues with the security of candidate details, and the possibility that candidates may undermine the login system by sharing usernames/passwords. That is always an issue and can only be overcome by emphasising to candidates the importance of logging in correctly.

Furthermore, the social issues which can be faced in a groupwork situation may be lessened through the detachment of artefact and authorship. In a wiki "ownership" labelling is done automatically and unobtrusively and moreover it encourages people to shape and change others' work, yet retain the authorship identity and the roles that people have played in shaping the final artefact. As the authorship data is held separate from the main body of the text, it becomes detached from the participant, hopefully overcoming some of the shyness identified by Benfield. Also, as people are encouraged to shape and edit each others work, the final product becomes more fluid and retains community rather than individual ownership.

Conclusions

SQA is piloting the use of social software in Project Based National Courses, which require the submission of evidence of participation in a group based project. Together with a blog to allow candidates to report and reflect on their learning, groups will be given a wiki as a presentation and working

environment for the evidence generated. The first candidates will be using the system in August 07, and the first assessment of candidates evidence through the medium of a wiki will take place in July 08.

It is hoped that this will provide additional evidence of ownership in order to grade candidates' work more reliably, through the provision of greater assessment information, and validity, by promoting group-working through the medium used to display its product.

Although we are aware that group-working is associated with a number of issues, including social loafing and freeloader syndrome, we believe that using a wiki will allow us not only to identify these phenomena, but also empower the other members of the group to directly challenge others indulging in such behaviour in a positive and non-confrontational way. We also believe that, in providing a discussion space, this medium can present a solution to conflict arising in a project, which may otherwise hamper progress or cause group-members to withdraw from the work.

We are excited by the possibilities that this opens up to encourage collaborative working and explore new assessment paradigms – seeking to expand validity while retaining the reliable of more traditional assessment forms. We will continue to monitor the effects of groupwork assessment both on the subject under consideration and the core skills which underlie it.

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