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Key factors for effective organisation of e-assessment

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KEY FACTORS FOR EFFECTIVE ORGANISATION OF E-ASSESSMENT

Cornelia Ruedel, Denise Whitelock and Don Mackenzie

Key Factors for Effective Organisation of E-Assessment

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Abstract

The benefits of e-assessment are widely documented (Bull and McKenna 2004). However, instances of good practice have not been systematically reported. Recognising and acknowledging this gap in the research, the JISC Organisational Committee has funded a number of projects on e-assessment practice: 'E-Assessment Glossary', 'The Roadmap to E-Assessment' together with a set of case studies of innovative and effective practice.

This paper is based on the findings of the JISC Case Study Project "The innovative and effective use of E-Assessment". Members of the project team conducted over 90 interviews with teaching staff, senior management, developers and students to showcase all aspects of e-assessment. The project offered a unique opportunity to observe different organisational structures and gain inside-information about the effectiveness of a number of different applications. The 17 case studies and their follow-up surveys have been studied to identify the facilitating factors for the introduction of e-assessment and the organisational structures supporting e-assessment have also been investigated. The focus of this analysis was to study the different organisational structures and to identify patterns herein.

We suggest that the key characteristics for the typology are the position of the e-assessment within the organisational structure and the support from the senior management. Three types of organisational structures are identified by the study, which support innovative practice. These are the Central Team, the Faculty based Team and the Departmental Champion.

The Central Team offers e-assessment support and, in some cases, production services to all academics on a university-wide basis whilst the Faculty Based Team provides a more limited discipline-related service. The Departmental Champion usually implements e-assessment within his/her specific discipline and may be an early adopter or have a special interest in this area.

Introduction

In this paper we investigate the key factors for effective organisation of e-assessment using the data collected from the JISC Case Study Project. Over 90 semi-structured interviews were conducted with practitioners, support staff, senior managers and students. During the site visits, it was observed that different institutions had diverse organisational structures in place to manage the implementation of e-assessment. This gave rise to the question of how might these organisational differences impact upon the effectiveness of promoting e-Assessment. White (2006) raises similar concerns with respect to the adoption and integration of any new technology within a given organisational structure.

Background

The factors underlying the relatively slow and small-scale take up of e-assessment within higher education merits some investigation. A possible explanation can be found if the introduction of e-assessment is compared with the introduction of e-Learning or with the uptake of innovations in general.

For example, Warburton & Conole (2005) used the Diffusion Theory from Rogers (2003) to model the uptake of e-assessment. Rogers (2003) defines

"*An innovation is an idea, practice, or object perceived as new by an individual*". According to Roger (1968) several variables influence the adoption of new ideas, these are: "*The situation, the personality of the adopter, the social and economic status of the adopter, the lines of communication used and the innovation itself*". To help to understand the adoption as a process Rogers (2003) categorized the adopters into five groups using the time of the adoption as measurement. The five types of users are: Innovators, Early Adopters, Early Majority, the Late Majority and the Laggards. Geoghegan (1994) identified a 'chasm' between the early adopters and the early majority (Figure 1).

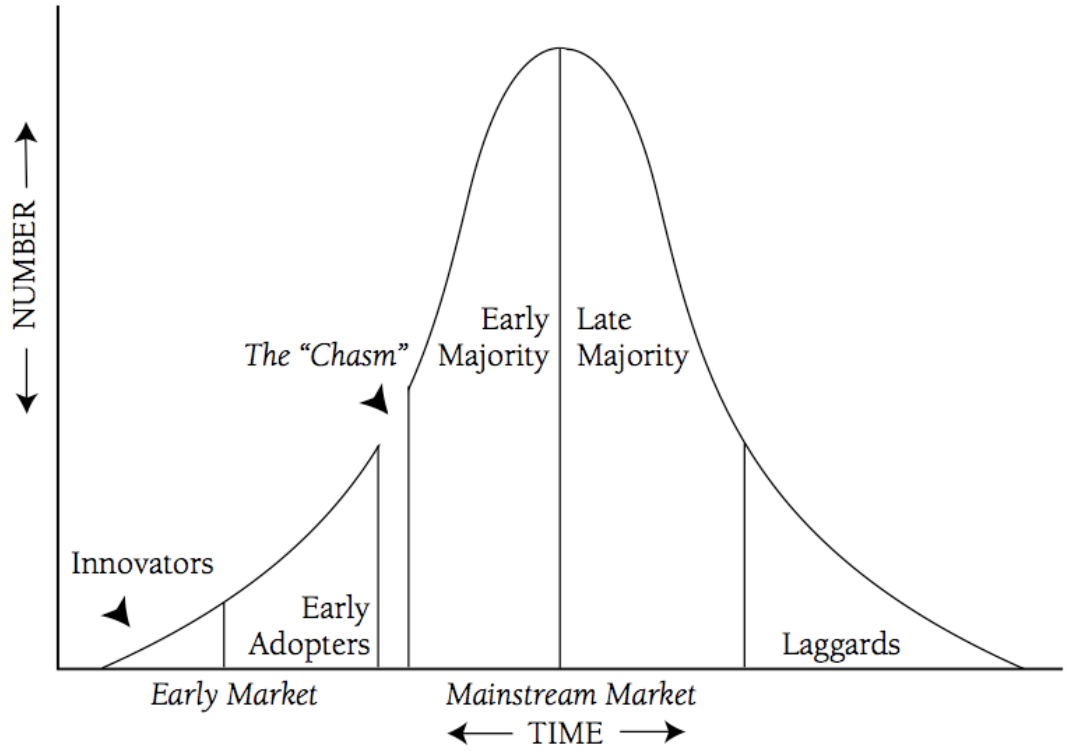


Figure 1. Chasm between the early market and the mainstream market (Gray 1997)

To understand this chasm it is important to understand the contrasting views and attitudes of the different types of users

Early adopters	**Early Majority**
Favour revolutionary change	Favour evolutionary change
Visionary	Pragmatic
Project oriented	Process oriented
Risk takers	Risk averse
Willing to experiment	Want proven practices
Generally self-sufficient	May need significant support
Horizontally connected	Vertically connected

The Early adopters want to be involved in the development of new ideas and are not afraid of failure, while the Early Majority grouping favours a more process oriented approach and wants to avoid taking risks. Therefore, these two types require different organisational support and support structures.

Geoghegan (1994) analysed the question of why information technology was not more deeply integrated into the curriculum. Several factors were identified: a shortage of equipment and facilities on campus, institutional support, unrealistic expectation of the development, use and dissemination and what he called the "Human factor".

The Human factor is important in order to understand how faculties and departments interact with each other. Academics are often not at the same stage of awareness or knowledge development with respect to e-assessment

as their peers. Therefore, different support structures must be offered at different stages. Hagner (2001) introduced a classification of four types of academics regarding the adoption of innovation in an educational setting. The four types are ”Entrepreneurs“, ”Risk Aversives”, “Reward Seekers” and “Reluctants”. The ”First wave“ of adopters or ’Entrepreneurs” are the first to adopt a new idea. They have appropriate resources either within their department/faculty or from an institutional level. The Entrepreneurs share a strong interest in improving the quality of teaching and learning and have confidence in their own expertise in order to carry a new initiative forward. On the other hand, “Second wave” users have a greater fear of the unknown or failure. They require a more persuasive and user-friendly type of support to change their well established way of teaching. “Reward Seekers” however, adopt new technology if they see a clear benefit for their career. “Reluctants” firmly “believe that traditional models of teaching are superior” (Hagner 2003).

Furthermore, the uptake on e-Learning can be taken as an example for institutional change. Within the learning technology literature, there are various descriptions of drivers and success factors. Lisewski (2004) noted, “Implementation studies of learning technology have tended to display unsophisticated perspectives on the nature of the organizational culture”. They mainly concentrated on having a vision, strategic planning technical infrastructure und a strong leadership. McCartan and Hare (1996) identified four factors for change: senior management support, staff development, central services and funding opportunities. The 4-E Model was introduced by Collis and Moonen (2002) who identified the environment, educational effectiveness, ease of use and engagement as the most salient variables in their framework. Liweski (2004) too recognised a number of other factors such as ‘time and space’ for the innovation, effective communication at all levels, highlighting the operational aspects, staff development and a clear understanding of the requirements. Although the organisational aspect was mentioned, it was not addressed in more detail.

Walker, Adamson & Parsons (2004) did acknowledge the organisational aspects to the adoption of new technologies and recognised the presence of central support as one part of six key components of the successful delivery of e-assessment. The other five components included quality software, quality hardware, clear policies and procedures, integration within the learning system and staff education. Warburton (2006) noted that the strategic support and centralised organisational facilities are particularly evident in new universities. Existing good practice is shown as an institutional validation and as a direct impact in the uptake. A further commitment from the institutions can be seen as strengthening the physical infrastructure and secure funding. Warburton developed a concentric shell model of the CAA uptake (Figure 2) with the conditions, interactions and consequences. The conditions are divided into strategic cultural, infrastructure cultural, tutor cultural, tutor operational and infrastructure operational. Furthermore, he describes the principle mechanism driving the CAA uptake as sevenfold. The seven mechanisms are modelled upon a timeline with the starting point of ad-hoc dissemination of CAA practice at department level. The next step is the coordinated dissemination facilitated by Learning & Teaching specialists.

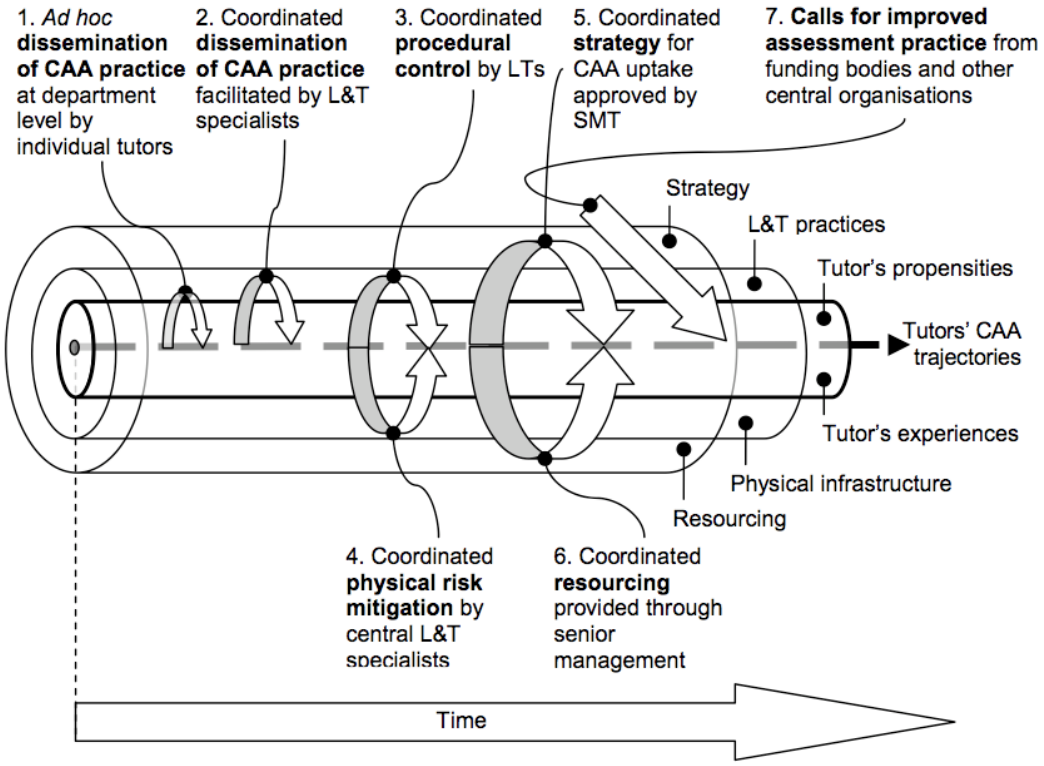


Figure 2. Warburton's (2006) Concentric Model of principle mechanism driving CAA uptake

Although the model is comprehensive and explicit, the question whether the organisational structure influences the uptake on e-assessment is not raised. In Warburton's model, there seems to be no step between the development by individual tutors and the co-ordinated practice from Learning & Teaching specialists. From the observations of the e-Assessment Case Study project, there is a step in between the developments from individual tutors and coordinated practice on a departmental level as described below.

Typology

The e-Assessment Case Study project offered the opportunity to investigate the different support structures for e-assessment in a wide variety of educational settings. The site visits, the interviews with practitioners, support staff and senior management gave a unique insight into how effective the organisational structures were and which approach works best under which conditions. The findings from the follow-up survey (Whitelock 2005a) were the basis for this categorization. The key factors which were salient to all the cases studied were the position of the e-assessment support-unit within the organisational structure and how the unit´s work was embedded within the institution's e-learning strategy. Other important factors include the support from the senior management and the funding available for implementation. This paper identifies three types of organisational structures that have

resulted in innovative practice for e-assessment, these being the Central Team, the Faculty based Team and the Departmental Champion (Figure 3).

The Central Team is not attached to any department and offers its services independently to all departments or faculties. However, the Faculty-based teams are attached to only one department and the services are only available to their staff. The Departmental Champion is independent from the central services and only 1-3 tutors make use of e-assessment.

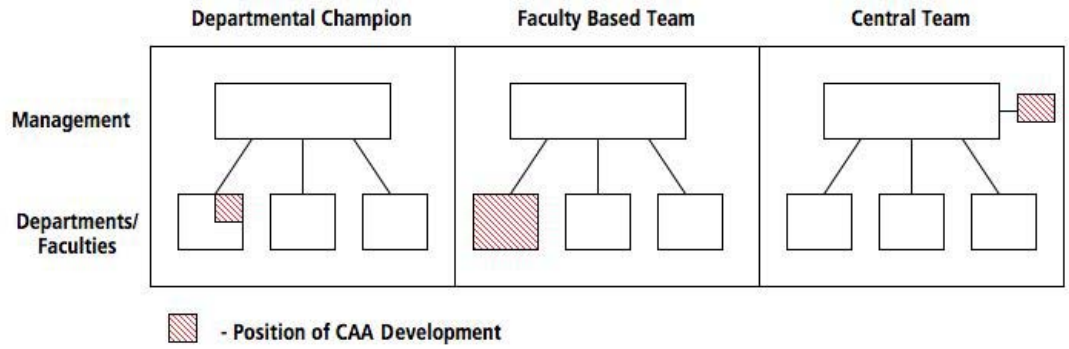


Figure 3. Organisational support structures

Departmental Champion

The Departmental Champion is well established within the faculty or the department. The drive for any given implementation of e-assessment was to improve student learning and assessment. This group of implementers falls clearly into Rogers' category of "Innovators" and has quite a long history of development. The findings from their projects are usually well documented and disseminated nationally, although the use of e-assessment across the University is often minimal. In many cases, the purpose of the development is to demonstrate the capabilities of e-assessment and may be seen as a feasibility study. The security issues for the e-assessments are well addressed and the delivery is through a closed-network or on paper as an OMR. The projects are tailored to a specific need either pedagogical or technical. However, they are too specialised to enter the mainstream of the university's assessment strategy and often the funding for the development of a particular type of assessment comes from outside the university. The Project Team identified Departmental Champions at UCL, University of Glamorgan, University of Surrey, University of Cardiff and others undertaking innovative work in e-assessment.

Faculty based Team

The Faculty-based Team centres on an enthusiastic circle of academics. It secures project funding at both the departmental level and from external sources. The e-assessment system may be commercial or developed in-house and is supported by a dedicated developer/academic or a team of developers. The team is led by an academic who inspires the pedagogical

and technical development. However, the infrastructure to facilitate e-assessment for large student groups may not be available and the students usually use the computer rooms of the faculty/department in order to sit the examinations/tests. The in-house e-assessment system may be developed up to a commercial level and all security issues of the delivery are addressed Heriot-Watt University is an example for a Faculty based Team which has a great reputation and a long history of expertise.

The development of feedback rich formative e-assessment can be one of the features that has been particularly extended. The in-house e-assessment system or use of e-assessment in general may be part of a nation-wide project initiative and is disseminated nationally and internationally. For example, the team at Birkbeck College built on their departmental work to attract external funding for the FDTL4 – OLAAF (Online Assessment And Feedback) project that has brought together a number of faculty and departmental champion initiatives across a range of institutions. Senior management may or may not build on this approach within the participating institutions to create a university-wide initiative. Therefore, the impact of the project can still be limited to the department or faculty despite its inter-institutional success.

Central Team

The Central Team develops, supports and coordinates the e-assessment activities university-wide. Commercial software (e.g. Questionmark Perception) is often installed to facilitate e-assessment, although the TRIADS system from the University of Derby is used successfully for the university-wide delivery of summative assessments. E-assessment applications are well integrated into the VLE and university processes and can be accessed anytime and anywhere in some cases. Students use it for summative or formative assessment and are aware of the benefits.

The Central Unit may act as a facilitator for individual academics wishing to deliver e-assessments or it may go further and offer a complete consultancy, production, delivery and results reporting service. Mackenzie (2005) has outlined the relative benefits of the latter in terms of quality assurance of summative assessments when compared to a devolved tutor development approach.

The senior management of the educational institutions have invested in the infrastructure for the delivery of e-assessments. Computer laboratories are available for up to 200 students with separate entrances and exits and may be equipped to conform with the guidelines laid out in the BS7988 / ISO/IEC DIS 23988 'Code of practice for the use of information technology (IT) in the delivery of assessments'.

IT services and the central unit work closely together and have published procedures and guidelines to clearly identify all the tasks for the different

teams and services. The central unit may be integrated into the Centre of Teaching and Learning/Educational Development.

There are a number of communication channels, which disseminate the innovation 'E-Assessment' to the academics including a staff development programme. The most effective network seems to be where faculty-based E-Learning Coordinators, which is use for example at the University of Southampton and Loughborough University. The Coordinators inform the teaching staff about e-Learning in general and the possible uses of e-assessment in particular. This e-learning communication network seems to work effectively and even reaches tutors beyond the early adopters.

An alternative to e-Learning Coordinators is the use of academics in the role of e-Champions, which is used at the University of Derby in addition to Teaching Fellows with responsibility for e-learning. According to Rogers (2003), champions should be "charismatic" individuals who throw their weight behind the innovation". Information is more widely spread if it comes from a trusted source like a fellow academic. Drawbacks are that the workload of academics nowadays has increased dramatically and to sustain this type of initiative the individual champion needs to have enough time and energy for the full benefits to be realised by the parent institution. Staff development too needs to be offered on a number of various levels to cater for the different skills of the tutors. It is vital that the academics can choose the type of training that supports their own requirements. The most frequently used form of staff development has been the workshop or seminar while one-to-one consultations have been offered for more specific problems. The provision of structured online courses for tutors has been found to be very successful, for example, the 'Assessing Online' module at the University of Dundee (Walker 2004).

Discussion and Conclusions

When reviewing the development of e-assessment via the three different organisational structures noted above there seems to be a correlation between the provision of a 'central' support team and the effective adoption of e-assessment.

The key factors of effective support are:

- The appropriate position, status and role of the e-Assessment Unit
- Effective communication channels incl. staff development
- Availability of respected and experienced 'champions'
- Support from senior management

The positioning of a Central E-Assessment Unit so that it is accessible to all academics on a university wide basis seems to be the key for successful delivery and dissemination because it demonstrates the commitment of the senior management to support e-assessment and demonstrates their

confidence in its effectiveness. Equally important is that the Unit works closely with the technical units (IT) and has the input from the pedagogical centre to provide integrated support.

It is helpful if formative e-assessment can be embedded into the virtual learning environment (VLE) and into the IT system available to academics on their desktop. Often the introduction of a VLE can be seen as a catalyst for a university-wide implementation of e-assessment. Embedding e-assessment activities into the VLE may help to 'kick-start' wider implementation, and even though the native VLE system may provide little more than 'quiz' functionality, it can lead to the adoption of more sophisticated systems and development of summative assessment as experience is gained.

The communication channels used to introduce and establish e-assessment as a valid tool plays a vital role. Staff Development programmes represent the traditional approach for training tutors in the effective use of e-assessment. Key to this approach is the availability of high quality, subject-specific exemplars. Academics new to this form of assessment often find it difficult to relate to examples outside their own discipline.

New methods such as the adoption of E-Learning-Coordinators or E-Learning Champions are being explored in many institutions to reach even more staff.

The support from senior management is significant for the delivery of e-assessment. Investment into the development of the e-assessment and into the infrastructure necessary to delivery it demonstrate the commitment of the management to implement the E-Learning Strategy and helps to enhance the status of early adopters and champions.

The three types of organisation outlined above could be seen merely as a classification system. On the other hand they may reflect stages in the natural evolution to more widespread adoption of e-Assessment within an institution outlined below and in Figure 4.

Stage 1: Enthusiastic academics develop/use an e-assessment tool which is used to deliver assessments to his/her students in the first instance. The findings of the pilot project are disseminated within the department/externally and fellow academics use the system to deliver more assessments.

Stage 2: Further funding from the department or external bodies facilitates enhanced software development or more sophisticated e-assessments. More widespread dissemination, both internally and externally can be used to validate the academic credibility of the systems or assessments and to bring the developments to the attention of senior management within the institution.

Stage 3: The senior management of the institution acknowledges the development and initiates a central support unit to establish e-assessment as a credible and valid tool for learning and examination and provides an academic support infrastructure that encourages the development of e-assessment embedded in e-learning.

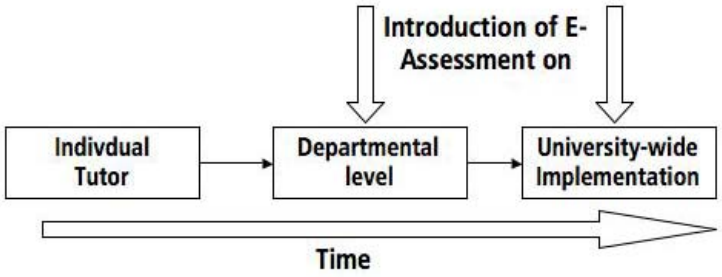


Figure 4. Organisational support structures

The outcomes of the Project indicate that typical timescales for this evolution from early adopter to relatively mature and widespread implementation have been of the order of ten years or more in those institutions where e-assessment is currently well developed.

Good internal communication and dissemination of grass roots developments to the highest management level within the institution is key to the successful movement between these phases. On the other hand, top-down imposition of e-assessment methods without sufficient support or pedagogically sound exemplars from well respected members of staff has the potential to promote resistance and slow development.

Recognition of the stages outlined above should help institutions to identify the actions necessary to progress through the organisational and infrastructural barriers between them to a more widespread adoption of appropriate application of many types of innovation.

As observed in one or two cases studied during the Project, progression beyond the three stages outlined above may lead to the commercialisation of e-assessment software, bespoke e-assessment development (University of Derby) or e-assessment training (University of Dundee) that is capable of generating external income for institutions that are prepared to grasp the nettle and invest in the appropriate staff and infrastructure.

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