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# Transformative approaches in distance online education: aligning evidence to influence the design of teaching at scale

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## ABSTRACT

In this paper we consider the role of sharing evidence online in work in progress to develop a new teaching framework for distance and part-time students of The Open University. The work reported here looks at the motivation for applying evidence and how it can act to support the development of the framework, rather than the framework itself. The approach described is adapted from previous research projects, and focuses on how evidence from internal and external scholarship is gathered and refined through an Evidence Hub that is shared online and open to all in the University. An aspect of the framework (offering greater continuity of study) is selected to show how the methodology applies in practice. In conclusion we highlight the value in adopting evidence-based approaches to support change processes and how sharing collective knowledge can influence decision-making.

## Author Keywords

Collaborative knowledge building; institutional change; evidence hub.

## ACM Classification Keywords

Human-centered computing --- Human computer interaction (HCI) --- Collaborative and social computing --- Collaborative and social computing theory, concepts and paradigms --- Collaborative content creation.

## INTRODUCTION

The Open University (OU), a distance university established in Britain nearly 50 years ago, has grown to be the biggest in the UK. From its inception, the OU offered courses to thousands of learners accepted through open entry and has carried out research into online methods of instruction intended to maximize the quality of the courses offered to students. The University now operates as a provider of online education to 150,000 students registered

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for qualifications and to over 12 million informal learners. The OU has over time responded to the changes in the online learning landscape and attempted to do so using appropriate evidence [e.g. 5,7]. This paper describes how we are now innovating the way evidence is being used during a design process to help the University renew its approach to teaching. In particular in this paper we focus on how *change* raises critical questions about its impacts on future student performance and operating costs, and how internal and external evidence can be used to generate possible answers to questions posed as hypotheses in a way that can be examined and, if necessary, challenged by stakeholders. Our approach is consistent with previous attempts to collate actionable evidence from empirical studies and applications of theory to instruction [e.g. 1,6,8].

This paper considers the strengths and weaknesses of such approaches and highlights the importance of context in the interpretation of the applicability of research findings in Education. The setting for this work is part of a comprehensive program of change focusing on teaching part-time and distance learners at scale.

## REVIEW MOTIVATION AND REQUIREMENTS

At the core of this approach is providing an Evidence Hub, i.e. a tool for debating and building evidence-based knowledge and practice by pooling the community collective intelligence on what is evidence for an idea [4].

### *'What works' vs the 'Evidence Hub' approach*

Driven by the way marketing language is affecting decision making in different sectors, including education, the What Works 'movement' aims to identify robust methods to add humility to the success stories that some intervention claimed. Based on the use of randomized controlled trials and a more systematic analysis of what is working where, and why, it aims to provide clear directions on which decisions should be made. This approach can be criticized as being insufficiently attuned to context [2].

The Evidence Hub approach in contrast does not gather exemplars of good practice and does not claim that a particular exemplar is the only way to achieve positive results. It builds on the plurality of evidence internal and external to the institution so that decision makers are informed by evidence during their quest for institutional change (see [3 and 4] for previous uses of the Evidence Hub).

## **APPLYING EVIDENCE IN A CHANGE PROCESS**

The Open University has established a program to support major change comprising several working groups to consider different factors. One of these is focused on the teaching process, with a main output being a changed framework for teaching at scale for part-time and distance learners. Alongside direct work on the framework, our sub-group ensures that there is an evidence base for statements in the framework and that, where required, experimental pilots can be put in place to learn lessons ahead of change at scale.

A key challenge in this work has been how to share evidence and to align it with the emerging statement of the framework. To achieve this an Evidence Hub approach was adopted. This has been used in previous projects, notably for a collation of evidence for open education resources [e.g. 3, 4, 7]. The characteristics of an Evidence Hub are that statements are developed as hypotheses and that when linking evidence (for example academic papers or internal performance data) a statement included to link the evidence to the hypotheses. Typically this means being prepared to provide a summarized position on interpretation of the data as well as the data itself. As an approach this was felt to be very appropriate to the OU context in which there is considerable data on student performance and a strong history of internal scholarship activity. Together these gave a range of candidate resources to be aligned with the needs of the framework.

The Evidence Hub in previous projects has been presented using custom software (built around WordPress). That software supports visualizations and allows querying of the hypotheses in a variety of ways. These advantages however needed to be considered in the context of internal use within an organization with established toolsets and security systems. Our analysis identified that the philosophy and approach of the evidence hub was more important than the software base and so an instance of a Microsoft Office365 SharePoint Wiki was established. This enabled equal access for members of the University and operation alongside an existing Scholarship Exchange using the same technology.

### **Procedures**

The Evidence Hub can be seen as a technological tool to support debate and knowledge building, and so support learning within an institution. We therefore follow a design-based research approach where the tool is developed through iterative phases of multiple enquiries of how people learn [1]. The Evidence Hub has the ultimate goal of developing an evidence-basis to support the transformation within the institution. It therefore supports a virtuous cycle of research and practice, continuously interacting with and feeding each other [1,8].

While there is a core team curating and refining evidence, every member of the University staff community can add evidence. These additions can be made directly to the Wiki system, more typically a submission form is complete that is reviewed later by the core team. The review is based on

consistency across all entry items and provision of the relevant evidence provided. From such activity, a smaller set of users reflect on the emerging challenges, and respond through the addition of new pages or the alteration of existing pages.

To make the wider community aware of the Evidence Hub, demonstrations of how to use it have taken place across the different communities. These are part of wider events that promote the need for institutional change. During those events, the team receives feedback on whether elements are clear and helpful or not. These university-wide events facilitate the development of the Evidence Hub and allow different stakeholders to provide requirements for use.

The Evidence Hub will be effective if it is pivotal to the type of changes to take place. For example in workshops members of staff cite examples of evidence from the Hub when making points or advancing arguments. The Evidence Hub has therefore multiple roles:

- to inform the community of existing evidence as it becomes available;
- to allow the community to create a common consensus of what the evidence means
- to facilitate discussions around validity and scalability of data and contribute to evidence-based decision making.

The Evidence Hub provides an online space where people can be informed of evidence and negotiate its meaning. In this way it provides a space for people to come back, process newly added information and fill in possible gaps. They could also provide evidence that might be internal to their area of expertise or their department but not public to the university. The Evidence Hub however is not a repository of reports or prior scholarship work. It offers a filter onto other repositories that distills the most important issues, ideas and evidence and makes clear how and why such evidence is relevant to the ideas under investigation [4]. It offers therefore a succinct way of looking at hypotheses with their evidence base, together with links and citations to full reports. An emerging requirement was to then consider their impact on specific measures such as student performance and operating costs. Such impact is not easy to predict; the Evidence Hub therefore is the space where the interpretation of evidence can be negotiated and challenged by different stakeholders. Engaging and responding in this process has then led to identifying further evidence to be incorporated.

The Evidence Hub also offers a window to the range of data; it challenges an institutional tendency to focus on some data and not others, depending on the narrative being told. Therefore the Evidence Hub provides the space where negotiation of evidence takes place and people explore different arguments.

As the institution changes in parallel to the development of the Evidence Hub, the intention is that people will obtain more informed access and understanding to decisions about the transformation. By having open access to evidence,

people can become aware of what it is known, and what is unknown about an issue. Therefore discussion around the transformation process should be improved by stakeholders having a deeper and broader understanding of each proposed action, following an holistically evidence-based approach.

### Types of Evidence

The Evidence Hub offers a web-based interface that gives some flexibility in using analysis and visualization tools.

Evidence is collated from a range of sources internal to the university and also sources external to the university, for example from higher education policy and statistics or research into the learning sciences. The latter helps in considering specific innovations to teaching that have been beneficial to different contexts, e.g. communities of practice. In this way the Evidence Hub is also an influence on the degree of trust that individuals can have in suggested changes prior to their adoption.

### EXAMPLE OF USE OF THE EVIDENCE HUB

To illustrate the transformative approach of the Evidence Hub this section considers the example of **continuity of study** for distance and part-time students.

Initially the work focused on defining flexibility of study and what it meant for the University. Since online and distance education flexes boundaries of place, timing, learning outcomes and access, specifying different elements for flexible study became an initial objective of teaching at scale. It was specified, among others features, by allowing multiple start dates across the year (e.g. 4, 40 or 365 start dates). Going through a consultation phase, we collated institutional-wide arguments in support of this change and requests for evidence. Evidence was formatted as the impact of X on Y. In particular:

- The impact of multiple presentations on recruitment
- The impact of multiple start dates in student numbers, where it was trialed in a small scale within the university and outside the university.
- The impact of multiple start dates on student performance;
- The impact of gaps between modules or temporal overlap between courses on student retention;
- The impact of variable study speeds on student retention
- The impact of workload intensity on student dropouts
- The relationship between actual workload (time spent studying) and student success
- The impact of concurrent study to student retention and pass rates;
- The impact of Induction material on student retention and engagement

#### *The Impact of X on Y: focusing on X*

We notice that flexibility is considered through multiple perspectives in particular: concurrent study, multiple start dates, workload intensity, variable study speeds, induction material, and flexibility in time and pace. Such perspectives provide evidence towards different directions (positive,

negative, not relevant). Therefore the Evidence Hub becomes the place where evidence for different actions is presented *together*.

#### *The Impact of X on Y: focusing on Y*

We also notice that studying the overall impact of something can be challenging. Almost every statement on the Evidence Hub has a different outcome. In particular, the Evidence Hub provides the impact that X (e.g. concurrent study, multiple start dates, workload intensity, etc.) could have on retention, recruitment, student numbers, student performance, student dropouts, student success, pass rates, engagement. Therefore the Evidence Hub approach provided the *means to identify the multiple successful outcomes*.

What is more, ‘multiple start dates’ could be implicitly assumed to be beneficial to the University. The evidence provided the conditions under which this could be true and whether such conditions were present at the University. It highlighted prior best practices and challenges and the Evidence Hub started shaping the language and ultimately the arguments presented as a framework. For example, as the documented framework went through iterations, it became apparent the benefits of “multiple presentations” were aligned better with “continuity of study” where strong evidence showcased the positive impact.

Additionally, the identification of the relevant evidence meant that arguments for change needed to be informed accordingly. The evidence-based approach helped move from a historical perspective on applying only specific sets of data to decision making. It also offered the space where newly formed knowledge was presented, as required by incorporating check and review points into the iterated development (“stress-testing”) of the framework. In this example, the Evidence Hub collated evidence to support change and it promoted an evidence-based approach to decision making.

### FINDINGS AND IMPLICATIONS

The development of the Evidence Hub emphasizes the value in adopting research-based approaches to support change processes for teaching at scale. The example ‘continuity of study’ illustrated the effects of the Evidence Hub in two levels:

the *micro level* by

- presenting together evidence of different actions
- identifying multiple successful outcomes
- shaping the language and ultimately the supported arguments

the *macro level* by

- highlighting best practices and the conditions under which statements become true
- taking a historical perspective at institutional decisions and incorporating prior work to decision making
- presenting and negotiating newly formed knowledge

The Evidence Hub operates as an analytic approach to aid institutional transformation and improve communication.

Such approaches are not commonplace and so the development of shared space is a potentially valuable contribution to the toolset of decision makers.

Link to: Summary of evidence in the hub as of 14 March 2018

### 1. Providing students with personalised open learning, and enabling them to with appropriate flexibility that recognises their needs and circumstances

#### Presentation patterns

- Hypothesis: Student retention between modules improves when gaps between modules are eliminated
- Hypothesis: Student retention between modules will improve when temporal overlap between modules is eliminated
- Hypothesis: Student withdrawal increases with workload variation
- Hypothesis: As workload intensity increases, student dropout increases (Requested in faculty feedback to TF)
- Hypothesis: Variable study speeds increase retention
- Hypothesis: Student performance does not vary across different presentation start dates
- Hypothesis: Multiple presentations increase recruitment (Requested in faculty feedback to TF)
- Hypothesis: Student retention within modules will improve with more flexibility in time and pace (Requested in faculty feedback to TF)
- Question: What do we know about the relationship between actual workload (time spent studying) and student success? (Requested TF)
- Hypothesis: Induction material increases retention and engagement
- Hypothesis: Concurrency of studies impacts pass rates
- Hypothesis: The number of student registrations for modules offered anytime are similar in all months of the year

## Challenges

Such a transformative approach is not without challenges and the section below addresses those that the team has come across. As a work in progress, these challenges are fluid and might change with new experiences.

### Terminology:

Through the Evidence Hub it became apparent the frustration around different ‘evidence’ or the terminology used within the University. For example, when people requested evidence around ‘retention’, data could refer to pass rates, completion of study or progression to the next stage. Evidence therefore was better considered as relating to overall student success rather than retention. The Evidence Hub, therefore acts to identify and clarify misleading or multi-faceted terms. To facilitate an institutional consensus of those terms, the need for a glossary was also identified and subsequently developed.

By bringing the illusiveness of such terms to the fore, the organization of statements in the Evidence Hub changed as did the relevant questions. Therefore, by highlighting hidden inconsistencies in the evidence, more relevant and direct evidence was provided to inform decision making.

### Potential for miscommunication:

Hypotheses in the Evidence Hub are expressed with a direction of expectation, e.g. concurrent study improves retention. Some of the evidence linked to this may well be negative and not support the stated hypothesis. Furthermore, the evidence strength and robustness varies; evidence could come from a single example or a cross-university implementation. For those with limited time to engage, this risked a focus only on the initial hypothesis statement and may then leave a misleading impression. To mitigate this challenge, succinct summaries were added to sections indicating depth of support through color-coding.

## CONCLUSION AND FUTURE WORK

Over the past few years work in MOOCs have accelerated progress in knowledge about how to scale the delivery of instruction and how to collect and mine massive amounts of data [8]. This paper applies such experience along with

organizational knowledge and describes how we have leveraged research to inform the design of a new teaching approach for distance and part-time students. Following a research-based approach to support institutional change for teaching at scale, we highlighted what access to evidence means and what effects that can have at micro (language and arguments) and macro level (institutional decision making). It also emphasized how sharing collective knowledge can transform direction of travel and how the Evidence Hub has achieved that.

### Future work

The Evidence Hub covers a variety of topics, driven by the needs of the teaching framework. Identifying relevant work as it emerges and is added to different institutional repositories is an extra challenge that needs to be addressed. Additionally, ways for automated data entries may be explored, e.g. by visualizing student-software interaction data. It currently needs a great deal of authoring to provide insights of what such data means curated by a human expert data. Other future work could include tags for evidence annotation, dataset metrics, and other contextual information.

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