Flexible Learning Pilot ID34: Incorporating Knowledge-building Analytics

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Overview

The "Incorporating Knowledge-building Analytics" pilot project ran from 4th September 2023 - 21st June 2024. It was based around a 30-credit postgraduate unit in the Manchester Institute of Education entitled *Educational Technology and Communication (EDUC70141)*; hereafter referred to as ETC. This unit runs in a hybrid mode, with both distance learners and on-campus learners collaborating in the same virtual spaces, and working together in small groups (5-7 students) on a series of discussion tasks, the last two of which form part of their assessment. In 23-24 the course had 130 students registered on it, formed into 20 groups.

ETC's use of assessed discussions makes it an example of an *ergative* assessment approach, based around the grading of student *work* rather than just the *words* that are submitted at the end of the knowledge-building process that has taken place, and been facilitated, throughout the semester. The course unit, which is foundational to the MA: Digital Technologies, Communication and Education, is designed to develop students' academic and professional skills in various ways, through requiring them to:

* work together in small groups to solve design problems;
* make informed judgments about the use of technology to assist with this problem-solving process, whether in simulated or actual educational settings;
* articulate these judgments using online communications tools, and reflect on the process.

Therefore, ETC is a course fully suited, as described in the FLP strategy, to: "An increasingly digital world in which we must support and encourage learners to develop their digital capabilities at every point of the student journey." The study and evaluation of this course permitted the Pilot to fulfil the following 'visions' of the Flexible Learning Programme, as outlined in the strategy:

- Enhance the technology available to students and staff to support flexible learning;
- Identify and develop new opportunities for innovative course content and delivery;
- Shape our campus [*in this case, the virtual spaces and practices*] to accommodate flexible learning;

- Support digital skills development for students and staff;
- and, Identify and develop additional strategic partnerships for flexible learning.

In the case of the last bullet, this objective was hit through the Pilot being a collaboration with colleagues in the Ontario Institute of Education (OISE), University of Toronto.

The Pilot came under the FLP's Assessment workstream. The Pilot's primary focus, as its title implies, has been **learning analytics**, and how these might support a move to this different assessment paradigm. In the ergative approach, rather than being a "distinct artefact" that appears only at the end of a course, assessment is re-conceived as embedded throughout the learning process. In order for this to be possible, students need to be fully present in a **knowledge building** process of which the decision to award a particular grade has also taken account. An ergative assessment process can therefore be defined as one in which **the focus is on the knowledge building process, as well as (but not at the expense of) the product that represents that process**, whether that is a written assessment, a presentation or some other output.

Scrutiny of the knowledge-building process, as well as just the product, is a means by which the misuse of generative AI can be detected: and, more importantly, interventions can be made to direct students away from such misuse, *before* it becomes something which negatively impacts the quality of their final assessment. This was not an outcome written into the original FLP bid, but emerged as a significant unanticipated benefit.

To give work this necessary visibility requires **multiple points of observation** within the course environment. This makes ergative assessment processual, and therefore, **dialogic**, and as part of this dialogue students demand, and deserve, answers along the way to the basic question, 'How am I doing?'. The observation points exist as much for students to self-scrutinise, and to make reflective judgments about the work of their group: "How are ***we*** doing?". Through this self-reflective process, and the spread of good dialogic and knowledge-building practices (Bereiter and Scardamalia call these 'good moves' in dialogue), students come to identify themselves as competent practitioners, who can move forward and deploy these competencies in later (academic and professional) work. Hence, the ergative approach is one that meets the FLP strategic objective of **developing digital capabilities**, through ergative assessment dialogues.

The Pilot also played close attention to **workload** implications. Any proposed changes to the assessment paradigm will quickly be sidelined if they were to lead to noticeable increases in the workload of staff or students. Two aspects of the Pilot addressed this issue: first, the course design and its use of team teaching; second, the integration of digital technologies and learning analytics into the assessment process. The development of digital capabilities also applies to tutors and course unit leaders, who learned about how to enact an ergative approach, with the help of learning analytics generated by the discussion platform.

Therefore, matters of principal interest in this pilot included:
* The overall **design of an ergative assessment and its integration into a course**: what activities it is built around, how the teaching timetable is adjusted to 'fit', the different roles of tutors (TAs) and the course unit lead.
* The **generation of learning analytics** that provide tutor and leader with data on progress and semi-automate the feedback process, without loss of quality.
* Evaluating **the impact of the course design and analytics on the student experience**, including quality of work and reflexivity.
* Evaluating **the impact on the experience and workload of teaching staff (**tutors and the course unit leader).

Outputs

An evaluation report has been written and will be (we hope) made available through the Flexible Learning Programme web site. There are two versions of the report:

* the *abridged* version: this makes the general case for the ergative approach and reviews its impact on students and staff, based on the case study data.
* the *full* version: this offers more analytical detail and makes connections with, and between, supporting theories of pedagogy, technology and discourse.

Interested parties should read the abridged version first. The full version can then be read by those who might wish to deploy an ergative assessment approach in subsequent course offerings.

Staff development resources will be developed during semester 1 2024-25, in order that this work can be done in conjunction with the 'training' and induction for the next round of tutors (Teaching Assistants) on the ETC course. These will be released by Christmas 2024.

Summary of recommendations

1) There are certainly other courses being taught at UoM that already use an ergative approach, or are very close to it. The FLP should help **leaders of these courses to self-identify**: features from their particular approach to ergative assessment and/or their use of learning analytics could accumulate into a 'toolbox'.
2) **Staff development resources** can be developed. These do not have to be complex: they should start with a list of self-reflective questions…"What constitutes student work on my course?", and continue in much the same vein, guiding the course and assessment designers to reflect on, for example, whether they may already have points of observation set up, how to specify a clear and valid marking rubric, and more.
3) **Integrate an understanding of ergative assessment into course unit reviews.** Course unit specifications need to indicate points of observation prior to the final coursework submission. Each part of the assessment should include a clear marking rubric, including reference to learning analytics if these are to be directly drawn on in grading. Not *every* course unit need take this approach, but see recommendation 5.
4) We should **make room in timetables for the work required**, by substituting online knowledge-building work for lectures in later weeks of courses. Along the way this recommendation may also help relieve the intense pressure on teaching space on campus, which was another broadly intended outcome of the Flexible Learning Programme.
5) **Plan pedagogy at programme level.** It is not necessary for every single course unit to 'go ergative': but ensuring that students are engaged with the approach at least once in each semester of study seems sensible. This would allow for a sustained check on the progress of individuals, and also to set up an intentional, programme-wide dialogue when it comes to assessment.
6) The Pilot study shows that, with the use of learning analytics and the support of teaching assistance (tutors), as well as the careful design of the timetable, the approach is viable in workload terms. We therefore recommend that a **scoping review** is needed, looking at available discussion platforms (including, but not limited to, what will be available on Canvas) and assessing how the features and functionality of each might support the ergative approach.

Relevance

The remainder of this evaluation report is based around the headings and associated questions drawn from https://www.staffnet.manchester.ac.uk/flexible-learning/fl-pilots/ .

- ***Has the pilot topic and its activities met the information/experience needs of the intended stakeholder groups?***

Yes. The Pilot has gathered and analysed detailed information about how an ergative assessment approach can be operationalised.

Relevance to *student needs* include the positive impact of this approach on the student experience; on quality of submitted work (at least, for the course in question); and the development of their digital capabilities. "Supporting learners throughout their lifetime", as demanded in the FLP strategy, requires the development of problem-solving, knowledge-building skills, the ability to use digital spaces to collaborate, and helping students self-identify as reflective practitioners in both the academic and professional settings.

Teaching staff and *learning designers* need to be aware of underlying pedagogy, and the basis for integrating knowledge-building processes into a whole curriculum. In its simplest form the dialogic interaction is — "Show your working" then "How am I/are we doing?". Iterated through a course unit and then a programme, the interaction can reveal the knowledge-building process, allowing observation and assessment of it, and intervention to direct students towards better knowledge-building practice. Teaching staff also need to know to know about their workload can be managed, including through a) rethinking course timetables and b) drawing on learning analytics.

Committees/policy makers need a sense of why, and how, assessment can be reformulated to address the challenge posed by generative AI, and its potential to create disconnections between the the knowledge-building process and the product of that process; disconnections which constitute a profound threat to the integrity of the traditional HE assessment paradigm. This is as much a challenge for Flexible Learning as more traditional modes.

- ***To what extent are the completed pilot outcomes still in line with the needs and priorities of the Flexible Learning Programme?***

The existence of the 'Assessment' workstream to the FLP already shows that flexible learning cannot be properly implemented without thinking about how assessment is integral to it. The Pilot suggests ways in which the Programme should now move forward with a deeper and more sophisticated understanding of how assessment can be conceptualised in a rich, flexible and increasingly digital learning environment. How can everyone, students and staff alike, benefit from the multiple points of observation, to make assessment better both in general and in each particular setting and point of assessment?

Other objectives and priorities of the FLP have also been met. The 'Flexible First' approach requires, according to the strategy, "*more support for students and staff to develop their digital skills…we need to offer colleagues more support in designing a learning offering that works for diverse audiences and can be delivered through various modes…. The Flexible Learning strategy shifts the ownership of course creation towards design and delivery of teaching and assessment by a specialist team.*" The Pilot has, explicitly, considered how team teaching has been deployed in order to facilitate the knowledge-building processes that underpin the ergative approach, and specialist expertise has been drawn on from OISE in Toronto, hence meeting the need to "*Identify and develop additional strategic partnerships for flexible learning*".

The FLP seeks to "*provide spaces on campus where students and staff can innovate and collaborate*": this is important, yes, but the UoM requires effective, collaborative digital spaces too, and these must be designed in more sophisticated ways than just setting up a discussion board and saying "now discuss stuff". And in order for a truly Transnational education to emerge, these spaces need to be both synchronous and asynchronous (the ETC course requires students based in Asia to actively collaborate with those in Manchester, for example). There is a significant need to understand **computer-supported collaborative learning**, and how this takes place among the typical UoM student community, *in depth*. How are their knowledge-building dialogues shaped by the course design and the assessment brief? In what ways can tutors help learners reflect on these dialogues, and through this, come to identify as competent in this setting — a knowledge-building environment, focused around particular professional contexts? How can lessons learned in one space be transferred into later courses, and into the professional environment into which learners will graduate?

Efficiency

- ***To what extent did the methods/approaches used in this pilot lead to improvements in efficiency (financial/staffing/resourcing etc)?***

Incorporating some use of learning analytics into an ergative assessment approach was shown to have a positive impact on keeping the workload manageable. What specific form these analytics take depends on the context, and hence the student work/practices/moves in dialogue that need to be observed and assessed in that context.

- ***What other approaches could be considered in light of the pilot - would these be more or less efficient?***

As well as online tutorials, ETC's approach of reducing the number of lectures — or, rather, the expectation that there need to be regular lectures every week throughout an entire course — would, in general, be a way of using on-campus teaching space in a more efficient way.

Effectiveness

- ***To what extent did the methods/approaches used in this pilot lead to improvements in effectiveness (learning/outcomes/experience/flexibility, etc)?***

Students, tutors and the course unit leader all believed that the ergative assessment process had been effective with respect to learning outcomes, and had had a positive impact on the experience of the majority of students. Some tutors reported they would have appreciated more of an initial induction to the approach and the platform in use, but this will be enacted in subsequent iterations of the course, and codified in the staff development resources which will be created by Christmas 2024.

The ergative approach, based around multiple points of observation and intervention, was effective at revealing when students were misusing generative AI . The multiple points of observation in ETC allowed for easier identification of this, both during the course and afterward. The evaluation showed that when AI was used to generate *input*, into the knowledge building process, this caused no problems as long as the student(s) then *put in the knowledge-building work* required to assimilate the AI generated input into their discursive map of the problem space. Through such scrutiny they showed that they could judge the relevance, and possibly critique, modify or reject the input. Examples included the evident use of AI to summarise the statements of other groups, a requirement in the studied assessment. However, quantitative and qualitative

data show individuals and groups' (probable) reliance on AI to produce *outputs* lowered the quality of their submitted work. This is one advantage of the 'show your working', ergative approach. Another is that the Pilot showed the importance, and effectiveness, of *intervention*. The disconnection between cognitive process and product is revealed *during the assessment process* rather than only at the end, after the final assessment deadline, when it is too late for all concerned. Feedback can be given, and it can refer to specific moves made in the dialogue.

For example, one group whose good work at deconstructing a paper and judging its relevance for the problem they had been asked to solve, evident in their discussion, was effaced in the final output and replaced by a bland, one sentence summary of the paper's abstract. But the feedback prompted reflection on the dialogue, by referring the students back to specific moments in their knowledge-building discussion where they were doing good work with that paper. This approach had measurable impacts. In later activities in ETC students were observed putting in more work to identify the relevance of particular papers and, subsequently, reorganising their discursive map of the problem space in line with these judgments. Across the cohort, whereas around half the submissions for the first activity were decontextualised and generic, only 1 (out of 20 groups) was the same in activity 2.

- ***What other approaches could be considered in light of the pilot - would these be more or less effective?***

The recommendation is that ergative assessment should be integrated into all programmes: not every unit, but at least once per semester, we need to have a check that students are fully engaged in a knowledge-building process. These assessments could accumulate into a dialogic 'spine' running through a whole course, from first semester to final project.

The approach is innately more flexible. Online platforms mean that DL and on-campus students can be integrated into the same knowledge-building spaces. (cf. FLP strategy). Flexibility of *place* therefore.

Outcome

- ***To what extent was the pilot able to meet/exceed its objectives?***

These were the principal objectives, as written into the original bid for the Pilot:

Pilot aim(s)
To integrate analytics into the monitoring and grading of student work and thereby move to an ergative assessment model.
To improve the formative feedback process, making aspects of it continuous, without impacting on overall workload.
To equalise experience between on-campus and DL students, having them work in the same knowledge-building space, dialogue between academic and practice settings.
To develop in students digital skills and practices, particularly in the use of collaborative knowledge-building tools, and enhance their employability.

1) Analytics that were integrated into the monitoring and grading of student work were drawn from:

- those that were already built into the discussion platform [for an evaluation of the technology that supported the Pilot, see 'other lessons learned' below];
- ones that emerged during the teaching, and so were deployed in the ongoing course dialogue;
- ones that were developed *post hoc*, during the period of data analysis (Jan - Mar 2024). These will now be deployed in the next iteration of the course.

2) Formative feedback was provided in both intrinsic and extrinsic forms. Extrinsic feedback came at critical points from tutors and the course unit leader, and the Pilot showed that this was effective at changing practice, particularly when it came to the probable use of generative AI. Students' in-group dialogues were not just making judgments about disciplinary knowledge, or the design problem faced, but were also ways in which they reflected on their developing identity as competent actors in this setting — and competent users of the technology. Student evaluations revealed that they found almost all sources of feedback useful (the only exceptions being occasions where some students offered excessive amounts of validation to other group members).

Overall impact on workload was ameliorated by the use of learning analytics as the basis for feedback. Tutors used analytics to determine student engagement, identifying patterns in who was initiating discussions versus merely responding. Workload did shift somewhat, to earlier in the semester, but room was made for this by changing the nature of 'contact hours' in later weeks of the course, substituting online knowledge-building work for lectures, thus giving both students and staff the time needed to conduct this work.

3) The four ETC tutorials ran in a fully online format. Thus, the course was a 'hyflex', or hybrid/flexible one, meeting one of the goals of the Flexible Learning Programme — reducing pressure on the university's campus (offline) resources and spaces. Going online also increased the accessibility of the tutorials for part-time and distance learners. This had a positive impact on the course environment and the knowledge-building processes that occurred within it. Tutors observed that, on the whole, these were the students who were often more vocal and engaged in tutorials compared to on-campus learners, frequently having their cameras on and being willing to share ideas. They frequently led discussions.

4) Reflection on the experience of collaborative knowledge-building, using digital tools, was evident in student contributions. Through this there was evidence of their improved digital practice. There was some use of learning analytics in student reflections: through using visualisations such as a "Word Cloud" they could, for instance, reflect on how other groups might have been discussing the same topics but with a different emphasis, thus suggesting new lines of enquiry for their group. Or, they reflected on their own discourse and whether it was addressing the course's key concepts and set texts.

- ***To what extent has the pilot led to improved outcomes or behaviours in the stakeholder groups?***

Improved student outcomes were evident with quality of work, as already noted. No negative impact on student satisfaction was reported.

The Pilot has led to improved outcomes and behaviours in the field of Flexible Learning practice. The strategy states that an objective of the FLP is to allow "*staff to play to their strengths and balance the demands of research and teaching to maximise job satisfaction and outcomes*". The focus on workload in the Pilot has addressed this issue and shown that an ergative approach, with the help of learning analytics and supported by properly inducted teaching assistants, can be enfolded into the workload of a typical course unit leader on a T & R contract.

The strategy goes on to note that "*we will achieve this through greater support for teaching staff in designing and delivering teaching and new ways of recognising excellent teaching practice*." The full Pilot report (disseminated separately) constitutes a detailed guide to a range of issues involved in implementing the ergative assessment approach in other course settings. We suggest that (as has been the case for the ETC unit) it will take one iteration of a course to set up the assessment process with multiple points of observation and work out the demands made on analytics and teaching assistance, with a view to a full, analytics-enabled implementation in the following iteration.

Improvements to assessment practice for Flexible Learning along these lines in the medium- and longer-term depend on adoption of the recommendations in at least some programmes/schools. We do not suggest the approach has to be taken in every course unit, but a 'spine' of ergative assessment, on which students are working in this way at least once a semester through a programme, is desirable. Programme committees need to be mindful of the advantages of designing around this assumption, whether a degree is explicitly 'professional'-oriented or not.

- ***Were there any other unintended positive or negative outcomes from the pilot?***

Honing the ability of assessors to identify when generative AI might have been misused in the production of outputs was not originally a primary driver, and so was not mentioned in the original bid submitted to the FLP in summer 2023. But it certainly emerged as a positive and, potentially, highly significant outcome of the Pilot.

One of the clear markers of generative AI use in several of the activity 1 outputs was the very generic nature of their writing. Many references were made to technology use in HE as a general phenomenon, but never related to specific characteristics of the simulated setting as defined in the scenario. However, just as with the lack of reference to set texts — and this is another way of defining an assessment context more specifically — *feedback was given to groups and individuals* about this lack of contextualisation. And in activity 2, of all 20 groups there was only one which presented a 'generic' poster: the other 19 all included specific details from their chosen design setting.

In the end this is the problem with the misuse of generative AI tools. Use one badly and a student, or a group, will be delegating their cognitive work to an agent that doesn't understand the context, because it has *not been part of the knowledge-building process that has led to this understanding*. Thus, the agent is not an *authoritative* source, when judged against the specific context that is the background to the knowledge-building process.

The writing required at the end of an ergative assessment process is therefore not the kind of writing that can be *wholly* produced by generative AI, although it is accepted that these tools might help with tidying up grammar and phrasing, and helping with the inputs into the knowledge-building process. But making a judgment of relevance within a specific context, and reorganising a group's discursive map as a *response* to this judgment, are discursive moves that AI finds difficult or impossible to make. These conclusions suggest the importance of embedding ergative approaches into assessment practices across the university.

Sustainability

- ***To what extent has the pilot identified the potential for its activity to lead to the long-term behaviour/operational change?***

A case for the ergative approach has been made. The Pilot has shown the benefits the approach can bring, and its feasibility.

- ***What would need to happen to make these changes happen?***

The FLP strategy says it wants to get involved in assessment design, and this is a way to do so, in ways that could bring potential benefits university-wide. Active support could be offered through the FLP for teachers and programme teams wanting to make this change, backed up by the insights available in the reports. The abridged version of the report makes the case for ergative assessment, justifies the need and outlines the steps required; it then briefly outlines the findings from the gathered data. The full version of the report is a detailed guide to those wanting to implement the approach (knowledge-building, ergative assessment, analytics), and links the project to theories of pedagogy, knowledge-building and technology. Step-by-step resources will be developed in semester 1 2024-25, in collaboration with the team on the next iteration of ETC, and be ready by end of that semester. Many courses may already be working and assessing in this way, or be very close to it. Hence recommendation that the FLP reach out to course unit leaders and ask them to **self-identify**. Through these pieces of work a 'toolbox' of ergative assessment approaches can be developed and integrated into the 'Assessment Toolkit'.

On top of this, though, such a change will not take place without advocacy at T & L committee, quality assurance and strategic levels. We recommend **course unit specifications need to indicate points of observation prior to the final coursework submission**: Each part of the assessment should include a **clear marking rubric**, **including reference to learning analytics** if these are to be directly drawn on in grading.

Ergative assessment is not 'over assessment' — ETC students only rarely feed back that they feel they have too much to do — not least because alongside it, we can and should **make room in timetables for the work required**. Course unit approval committees should be more willing to challenge unimaginative teaching timetables — are those two hours of lecturing in week 11 *really* necessary? What will they actually add to a knowledge-building process that should already be well under way by that point in the semester? (Along the way this recommendation may also help **relieve the intense pressure on teaching space on campus**, which was another broadly intended outcome of the Flexible Learning Programme.)

Lessons learned

* ***Please also include any lessons learned on policy, systems, procedures, capacity, and support gaps that have either been enablers or inhibitors to your pilot.***

Systems:
The discussion platform used on the ETC course unit was Knowledge Forum (KF). KF is a computer-supported collaborative learning platform developed by Professors Carl Bereiter and Marlene Scardamalia at the University of Toronto, and designed around functionalities and features that specifically support the knowledge-building principles outlined in their work.

This Pilot has *not* been an evaluation of KF. Although the platform was an integral part of this project, the principles and practices that have been evaluated do not *depend* on this particular technology, even if certain features of KF did make it easier to generate some of the data on which we have based our analysis, and on which the learning analytics are therefore based.

Therefore, we are not now directly advocating the adoption of KF on other UoM courses. What we do recommend, though (see above) is that a 'scoping review' take place of other systems that offer similar functionality in support of ergative assessment approaches, including the generation of analytics. This could include existing UoM systems like Teams and Canvas, but should also cover

more specialised collaboration platforms (e.g. Slack, Miro) which are already being used around Manchester.

Enablers:
Our partnership with OISE in Toronto has been an essential enabler for the work. Dina Soliman has acted throughout as our 'knowledge-building consultant'; she visited Manchester in September '23 to help set things up, worked to facilitate the use of KF on teaching the course; and has been actively involved in this evaluation. The Pilot Owner (Drew Whitworth) has also spent two spells of time in Toronto (in January and June '24) and worked both with Dina and Prof Marlene Scardamalia on the project. This is a connection we should be loath to let peter out. The Pilot Owner is putting together a bid for ESRC funding to continue the research, but **we should be working with these partners on teaching and learning design as well, particularly if we can integrate this with the development of Global Classroom units**.

The level of funding of the FLP is a welcome change from many previous years' practice where there were calls to develop and evaluate teaching innovations from pots that were sometimes worth as little as £2,000 per project.

Inhibitors:
Nothing significant, but there's not been much of a sense of community among Pilot Owners. Information has been fed up the chain, but little if anything has come back down, and we don't feel we have much of a sense of what the rest of the Flexible Learning Programme is actually up to.

Support:
It has proven difficult to get project staff paid. The Pilot Owner's ignorance, at the start of the project, of relevant procedure has not particularly been altered by its end, thanks to conflicting advice and guidance provided from a range of different sources. Considering that we very much hope to continue collaborating with our strategic partners in Toronto it does little for the image when pay claims take months to be fulfilled.