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Introducing "The Matrix Classroom" University Course Design That Facilitates Active and Situated Learning Though Creating Two Temporary Communities of Practice

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This paper illustrates a radical course design structured to create active and situated learning in which students participate in communities of practice within the classroom, replicating real-life work situations. This paper illustrates the approach through a People Management module, but the approach is also used across a range of disciplines such as History and Psychology. The Matrix Classroom is a two-stage format which organizes students, firstly into specialism groups developing expertise in a specific aspect of knowledge, and secondly into applied task groups in which they apply their knowledge to a particular case, industry, time-period, or event. The design creates two temporary communities of practice which allow students to participate by both taking leadership roles and acting from the periphery, thereby gradually increasing their exposure and confidence in authentic work situations. This structure creates a peer support network of elected student leaders from whom they can gain "specialist" support. The active nature of the student-led activities are designed to re-contextualize abstract concepts into specific problem situations, thus preparing students for graduate life.

Erica McWilliam's call to "unlearn" our habits of teaching (McWilliam, 2008) encourages a re-think of what university teaching looks like and to move away from the "sage" and the "guide" approaches (King, 1993), which are firmly based on the transmission of knowledge from the teacher to the student. The transmission model is very well suited to lecture and tutorial format, as well as essays and exams type assessment, but it is very much based on the notion that *what* students learn is of greatest importance. As McWilliam (2008) points out, in the new "liquid modernity" to which Zygmunt Bauman refers, fixed knowledge sets and disciplinary content have a limited shelf life. Higher education in the 21st century needs to prepare students for solving new problems in an unpredictable world rather than simply acquiring knowledge.

In this paper, the authors illustrate a radical approach to course design that seeks to create an environment where students are in greater control of their learning and peer interaction rather than being overly reliant on the tutor for direction and content. This paper is an instructional paper and is not attempting to provide a theoretical development of these concepts, but this section will introduce the conceptual framework being adopted before illustrating the design.

The social-cultural model of learning is based on a social constructionist view of the dynamic between agency and structure such that knowledge is created in participation with others within a specific social and cultural context (Bassot, 2012; Quay, 2003). Bassot (2012) makes two key points about the nature of such learning: that people learn through activity which involves their whole person, and secondly, that change happens within "communities of practice." A lecture in which the expert in the room is guiding all discussions and content is not enabling the creative participation of the student cohort, but rather the engagement (or not) with lecturer-defined content.

Redesigning learning experiences to move towards student-centered learning is therefore likely to involve a broad range of tasks such as group work, short writing tasks, discussions, role-plays, simulations, and games which are aimed at decreasing the role and prominence of teacher-centered activity and increasing student participation. Furthermore, the relevance of these tasks to the discipline is important in developing a subject-specific community of practice; for example, students of business management need to develop and learn credible ways of being, speaking, and interacting that are transferrable to the business or organizational context.

As Cavanagh notes, "the benefits of active learning in lectures are maximized when tasks are authentic and reflect how knowledge is used in real life" (2011, p. 24). This involves a lessening of the importance of teacher-centered knowledge and as Quay (2003) notes, situated learning involves a shift in focus away from the individual as learner to learning as participation in the social world and therefore "decenters" the teacher.

> 'No longer is the teacher a person of authority imparting knowledge as information. The teachers in this process are other participants in the community of practice…Every experience of the learner is educative in some way' (Quay, 2003, p. 109).

A critical aspect of the situated learning model is the notion of the apprentice observing the "community of practice." Lave and Wenger (1991) propose that participation in a community of practice can, in the first instance, be observation from the boundary or

"legitimate peripheral participation." As learning and involvement in the culture increase, the participant moves from the role of observer to fully functioning agent. Legitimate peripheral participation enables the learner to progressively piece together the culture of the group and what it means to be a member. "To be able to participate in a legitimately peripheral way entails that newcomers have broad access to arenas of mature practice" (p. 110). They propose that the main functions of legitimate peripheral participation are to enable the learning of the language and stories of a community of practice, as well as to learn how to speak both within and about the practice. This process also honors the principle of Vygotsky's (1978) "zone of proximal development" such that the student is enabled to learn the next step which may be more easily accessed through peer support than tutor instruction.

While the lecture and seminar format becomes plainly inadequate to the task of building such communities of practice, it is also not enough to simply "bolt on" extra group exercises or case studies after the usual lecture. As Herrington and Oliver (2000) note, it is the creation of usable knowledge that is more applicable and transferable to other contexts. This requires universities to re-think their separation of learning and context and to provide learning experiences that allow students to re-contextualize abstract concepts into specific problem situations. Integrating such elements of whole person, real-life learning requires a wholesale review of the design of the course. This is more radical change as indicated by Hagopian's call for "[r]ethinking the structural architecture of the college classroom" (2013). It is the overall architecture of the course which is perhaps given insufficient attention in the design and delivery of courses.

As a module leader working with a set of validated documents that prescribe the learning outcomes for a course, there is perhaps a tendency to move quickly to fill a series of weekly sessions with content-led learning activities. The design considerations that led to the approach described here were an intermediate step before focusing on such content or activities. There is perhaps a danger that once the formal aspects of the macro-level features of a course are agreed and validated, the delivery team may well go straight into planning the details of delivery. While validated documents seek to move beyond knowledge into skills development, there often remains a focus on subject content and learning outcomes, which perhaps privileges content as the primary focus for subsequent course planning. Intermediate curriculum design features are perhaps given less consideration than either the validation process at institutional level or the design of learning activities by the course leader.

Intermediate curriculum design decisions may involve course teams' reflection on the learning process and skills outcomes and the creation of supportive learning networks between students, as well as with the tutors. This requires the design process to involve careful selection of key concepts, as well as the sequencing and pacing of these into the overall learning experience (Ntshoe, 2012). The authors acknowledge the importance of this stage of planning to arrive at a radical course re-design such as the one described here.

Radical Course Re-Design: Introducing the Matrix Classroom

This model was developed through a learning and teaching collaboration across History and Business subject areas at Leeds Trinity University as a result of a peer observation process and in alignment with strategic aim of delivering more innovative learning, teaching, and assessment approaches. It has been trialled in a Business course on People Management, which is the specific example described here, and also in History and Psychology courses. Further colleagues are now exploring the technique based on our early successes.

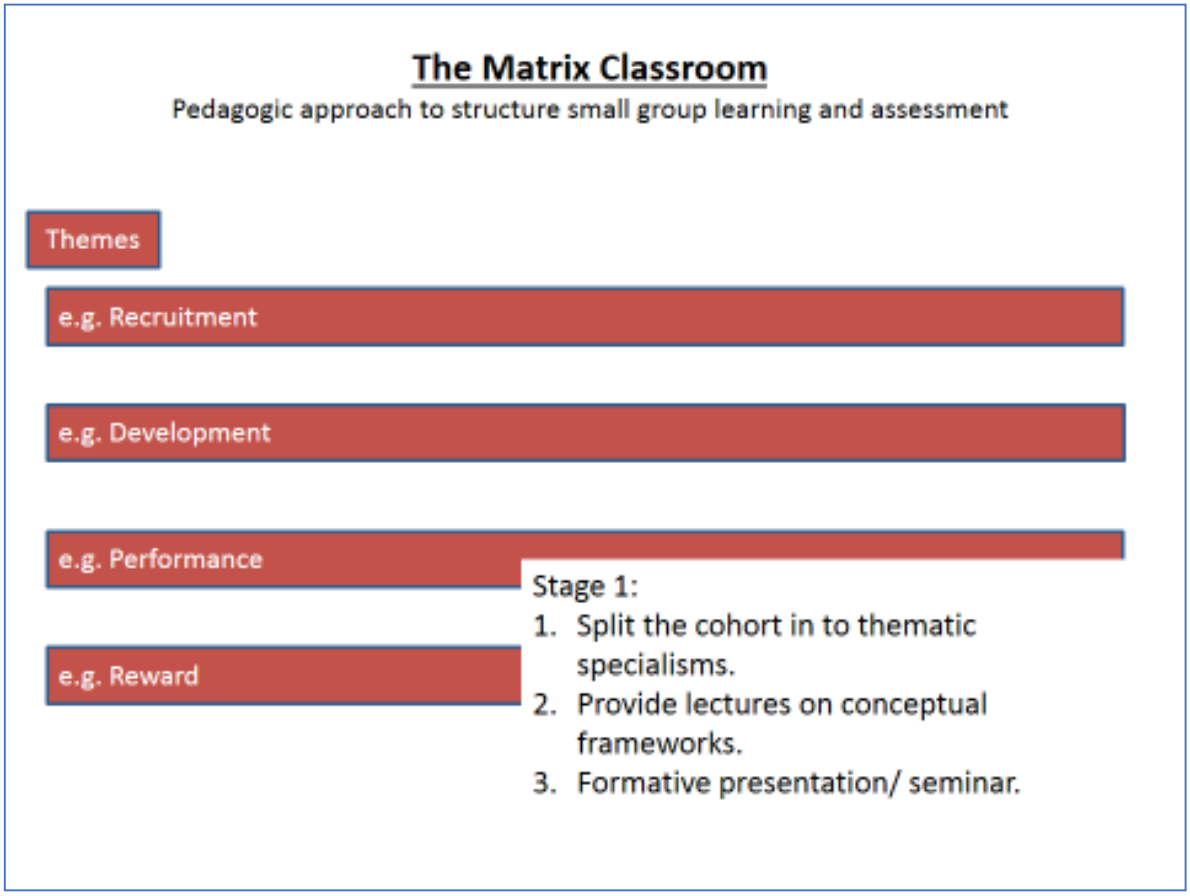
As a course leader of Business and Management programs, one of the authors, Roberts, was seeking to deliver learning experiences for students in which they formed meaningful communities of practice and engaged in realistic preparation for graduates seeking to use such knowledge in the workplace. It was evident that existing lecture and seminar formats and ubiquitous case study analyses remained limited preparation for real-life situations. While students were able to memorize materials and write essays about, say, people management, they were less able to transfer such knowledge to their workplace problems.

The instructional problem in this context was for students to understand a range of Human Resource Management policy areas while also appreciating the interpersonal, structural, and managerial issues involved in people management. The illustration below of the Matrix Classroom was a deliberate attempt to carefully re-contextualize the concepts and theoretical frameworks appropriate to the study of People Management within a classroom situation. However, this approach has also been applied in a History module where students have specialized in various historical techniques using sources such as oral testimony or texts before applying them to specific student-generated hypothesis testing.

The Matrix Classroom: Illustration of Application in a People Management Course

The Matrix Classroom provides a model for an over-arching course structure that creates a two stage process in which the tutor identifies four to six main themes and a range of suitable applications or contexts

Figure 1
Stage 1 of The Matrix Classroom design –specialist themes



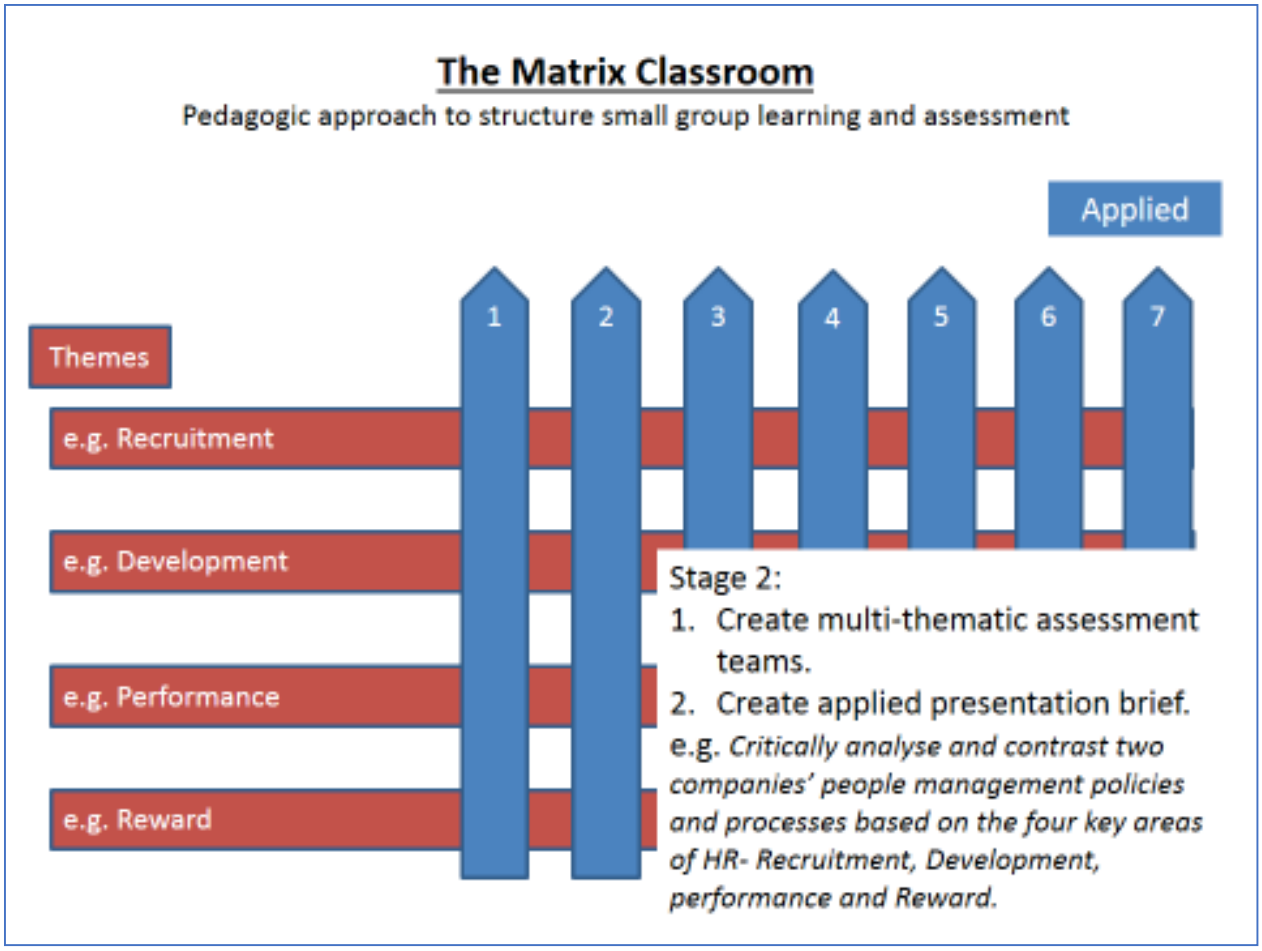
in which students may apply such knowledge. In this illustration, the People Management courses included some learning outcomes relating to group work, and the first assessment was a group presentation, the second an individual report. The model also allowed the tutor to build in real experience of some basic concepts such as recruitment or staff development by building into the structure an experience of students "recruiting" the groups of students to an assessment team and providing these teams with development activity. It is suggested that maximal student choice be built into this process while the tutor provides structural guidance and support. That is to say, the students feel like they are learning first-hand about the problems involved in recruitment, and yet this experience has been structurally designed to create this perspective.

Stage 1- Setting specialist groups. Firstly, the tutor identifies four to six main themes that together capture the broad content of the module. These do not need to be all-encompassing, but rather serve as the first scaffold that weak students may grasp. In the People Management example illustrated, the four broad themes used were Recruitment, Development, Reward, and Performance, as shown in Figure 1.

The early task of the student group is to split fairly evenly into each of these "Specialisms." An overview lecture may be provided to allow students to make an informed choice, but essentially students are entering such groups on the basis of interest and aspiration rather than already having any expertise. It has been found helpful to the course leader to ask students to elect a Head of Specialism and Deputy Head at this stage. This allows easy access and "steer" to the groups even when the tutor is not in control of the whole class at any one time. The appointment of deputies minimizes the potential for complete lack of leadership and also increases the numbers of students able to try out leadership roles.

The first two weeks of the course can now be spent in various tasks and challenges, thus helping the groups to develop expertise in their specialism. For example, first you may ask the groups to produce a quick five-minute presentation to the whole group by the end of the session. This flushes out the "Wikipedia type" answers and can

Figure 2
Stage 2 of The Matrix Classroom design – Cross-cutting assessment teams



allow the tutor and other students to provide some early feedback on how the specialist group can increase the quality of their work. Following on from this, they could be asked to produce a factsheet of key academic concepts relating to the theme, including an overview of some key articles that the tutor has provided. Finally, they may prepare a twenty-minute presentation ready to deliver to the remainder of the class in the next session. All of this may take two or three weeks of scheduled class time and ends with the whole class having received a student-generated lecture on all four themes, plus a factsheet of key concepts and articles written by students and for students.

Throughout these first three weeks, the tutor may consider some short, twenty minute lectures on key concepts and frameworks that may help students organize their thinking. This is essentially a stretching exercise for those highly able students in the groups who can take the lead in organizing the material for the presentations and factsheets and allow them to make sense of the articles. The remainder of the group may only have a partial understanding of these concepts at this stage but crucially, not only do they have notes, factsheets and articles for future reference, they also have two elected leaders from whom they can gain 'specialist' support at any point in the remainder of the course.

Stage 2- Cross-cutting assessment teams. The second stage in this course structure is to allow students to form assessment teams made up from one or two students from each specialism. This is illustrated in Figure 2. These are essentially multi-functional teams and are highly realistic of the kinds of work teams in which students will be expected to excel in post-graduate jobs. Again, it is suggested that this element can be student-led. For example, one of the specialist groups might be allocated the responsibility for this and asked to explore ways to make this fair and equitable for the cohort size and then to carry out the team allocation. Such experience can often be demonstrably

relevant to learning outcomes related to team-working and may also be assessed through some reflective element of assignment.

Given that one of the specialist groups is now conducting extra "team-building" work for the cohort, it is worth explaining that there will be other tasks required of the other groups at later stages. For example, a group may be asked to devise some team building exercises for the first time the teams get together in the following session. Another group may be asked to decide on a peer-grading system by which all members of the team can allocate each other marks for a portion of the grade. A fourth task may involve a consideration of what kinds of leadership a team needs to function effectively and conduct an exercise with the groups to ascertain their leadership needs and gaps. All of this can serve as a way of building confidence, rapport and familiarity as they prepare to leave what is now a familiar and functioning specialism group. This preparation phase into the main "twist" of the structure is an important time for transitioning into a new team for the second time in this course. These specialist groups remain a source of relational support for students for the remainder of the course. It will also be helpful to allow time to deliberately ask leaders to present their suggestions to the group and ask for feedback. At this point, the tutor role has receded in significance to the students as they are no longer the key person making decisions.

The classroom time in approximately week four will be moving into the new teams, according to the decisions and allocations made by the students. This session can be a variety of team-building exercises, electing new Team Leaders and Assistants (or any term that differentiates from the specialist "heads"), and starting to discuss the assessment brief.

At this point the tutor can identify a suitable brief that asks students to apply all four themes to a specific context or case study. Alternatively, this could also be handed over to the students as an element they could negotiate and create themselves. In the People Management example, the brief was to apply the four areas to any two companies. Students then negotiated their own titles as follows:

- Team 1: Critically analyze and contrast two companies' people management policies and processes based on the four key areas of HR-Recruitment, Development, Performance, and Reward.
- Team 2: Compare and contrast two companies HR policies in the four key areas of HR: Recruitment, Development, Performance, and Reward. Critically analyze the link with strategy and objectives of the business and make suggestions for improvement.
- Team 3: Design effective people management policy and process to support a new retail business based on the four key areas of HR-Recruitment, Development, Performance, and Reward. Demonstrate and critique the link with strategy and objectives of the business.

As can be seen, there is a huge amount of similarity, and yet there remains room for creative exploration on the part of some teams.

This second process of team building now offers students an authentic, work-like group experience to produce a multi-faceted piece of work for which they have some specialist knowledge. There are evidently challenges in this part of the process and further opportunities can be created to help students fall back on their specialist groups for help and support. For example, the next few weeks – five to seven – may include some time in specialist groups again briefly to share problems, clarify ideas, and gain support. The bulk of this time, however, will be geared towards producing a high quality assessed presentation, which again is work-relevant and can be assessed efficiently.

The key interventions by the tutor during this period is to provide key lectures on specific concepts which are more advanced and critical. This allows the better students to organize and build critiques of this knowledge set using appropriate tools, models and frameworks. Again, key academic articles can be provided for teams to consider during class time when the tutor can roam the room addressing questions and misunderstandings.

In the example of the People Management course, a mock presentation opportunity was provided for all groups, again during class time. During this feedback the key message given is, "What is your argument?" The main aim of this stage is to help teams structure their presentations with a greater academic judgement and emphasis rather than merely being descriptive.

Individual assessment. In this example, the course concluded with an individual assignment which required an overall understanding of the topic area:

"Critically analyze the role of HR in developing a coherent approach to people management. Use case studies to illustrate your argument."

The wording of the brief was deliberately kept succinct such that students needed to have participated the course in order to know how to unpack the statement. Students will have worked on this task as part of a group but now are required to understand the whole subject and present a coherent analysis and argument.

Main Features of the Matrix Classroom Approach

The main features of this approach can be described as follows:

1. Real-life learning through re-contextualizing abstract concepts. Tasks in both stages of the Matrix Classroom design reflect how knowledge is used in real life. Multi-functional teams are a normal part of working life and require members to bring specialist knowledge. The application of concepts to a relevant context or case study in the second stage assessment team reinforces the authenticity of the assessment tasks to students.

2. Shifts the student approach to teacher-centered knowledge. This design reduces the time spent listening to teacher-centered knowledge by simultaneously shifting the focus to students' extant knowledge, yet also increasing student awareness of key concepts as directed by the tutor. Given the challenging nature of the tasks, students find that the structure and academic content provided by the lecturer is valuable and helpful. Students are motivated to engage with these concepts to help analyze and articulate a specific problem. In the final stages of assessment preparation, the frameworks provided guide students in tackling a challenging and succinct assignment brief which requires a confident understanding of a wide subject area.

3. Communities of practice. The two temporary "communities of practice" created allow students to participate by both taking leadership roles and observing and acting from the periphery, thereby gradually increasing their confidence in exposure to authentic work situations. Legitimate peripheral participation allows students with little business or management experience to see other students tackle the challenge and observe the roles and patterns of behavior from the periphery. The experience of team leadership and team work is thereby "scaffolded" for the student in a way which enables attendance, engagement, and achievement across a range of ability levels.

4. Can accommodate student choice through Matrix design. The Matrix approach is structured loosely enough such that maximal student choice can be built into this process. The groups quickly develop into semi-autonomous units that respond well to being given choices, e.g., assessment brief, team building, or peer assessment process. Since communication between groups can also be facilitated and encouraged through the elected leaders, it is possible to efficiently reach whole cohort agreement.

5. Peer support structure. A key feature is the degree and range of peer support that the Matrix approach created. As well as being part of two separate teams, there is a peer support network of two elected leaders from both stages from whom students can gain support at any point for the duration of the course. It also allows each group a second chance to set up positive team working behaviors in preparation for the assessment. Nevertheless, there is some perception by students that they have been abandoned by the tutor and pushed to grapple with this knowledge alone. While a by-product of the group based class sessions means that a high degree of social support and camaraderie can develop alongside on-task behaviors, there remain some elements of student dissatisfaction with such a teaching approach. This has been discussed by one author in a previous paper (Roberts, 2016) and serves to reinforce the importance of creating opportunities for peer support.

Conclusion

Higher education in the 21st century needs to prepare students for solving new problems in an unpredictable world rather than simply acquiring knowledge. It has been argued that radical course re-deign is needed to decenter the teacher, create communities of practice and re-contextualize the learning of abstract concepts. Bolt-on measures that only supplement the traditional lecture and seminar format are arguably unable to provide students with repeated and prolonged exposure to interactive and student-led learning that is required to transform graduate behaviors. We have argued for the importance of the intermediate phase of course design that moves beyond the macro, institutional-level validation issues and needs to occur prior to the detailed micro-level course tutor development of content.

During this phase of course design, we have argued that course teams can consider radical re-design of courses that does not privilege transmission of content over student experience and application of such content. The Matrix Classroom as one such example of this approach is a two-stage design which shifts the central experience of students away from teacher-centered knowledge to shared and created knowledge. It has been shown that fundamental to this design is the in-built peer support created by these two temporary communities of practice.

Further empirical research is planned to explore the student experience of this approach across multiple disciplines such as History and Psychology. The authors are interested in establishing if there is an impact of such approaches on resilience levels in students given the requirement for them to rely on themselves and each other more than the tutor.

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