

What Traditional Apprenticeship Principles Can Teach Us about Active Learning

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ABSTRACT¹

Active learning has recently become a popular pedagogical tool, however, its antecedents stretch back to antiquity. While any non-lecture activity will positively affect student attention spans [1], mere activity alone is not sufficient to inspire students to engage in deep learning. An active learning module should further course learning outcomes, and foster critical thinking [2] and be perceived by students as a link between these classroom activities and the skill set they must acquire for their futures in the workforce [3]. Apprenticeship is also a model of learning that transcends its application to vocational training, having been used in areas as divergent as law, medicine, culinary arts and media production [4, 5]. As a model of learning, apprenticeship can be framed by four guiding dimensions – pedagogical, occupational, locational and social [6]. This paper draws upon these four principles to provide a conceptual framework for active learning activities in higher education, which may be of use to all instructors but especially those charged with teaching students 21st century skills.

Keywords: active learning, apprenticeship, constructivism, collaboration, problem solving, learning community.

1. INTRODUCTION

Lecturing is the transference of the notes of the lecturer to the notes of the student without passing through the brains of either (Anonymous).

The university lecture is a pedagogical tool that originated during the Middle Age. So too does apprenticeship date back to that time, when servant and master mutually bound themselves to each other, the master providing training while bearing responsibility for the servant's overall welfare [7]. Lecturing as an instructional tool had a practical application; the lecturer read from a text while students transcribed, thereby creating more copies of the text (Figure 1). Apprenticeship also in a sense made copies, apprentices increasing their skills until they too rose to the level of Journeyman and then Master. The lecture has managed to survive over the centuries by becoming the bedrock pedagogical tool for the transfer of information and knowledge, the theory being that the inculcation of knowledge occurs by way of verbal repetition. This theory has met with resistance in the 21st century as students demand more hands-on learning and instructors have (often reluctantly) come to recognize that the lecture is at best an inefficient method for knowledge delivery. Most universities currently include experiential learning in their curricula, with the creation of

incubators sprouting up on campuses, collaborative spaces and co-op and internship offerings.



Figure 1. The one teaching the many. Artist unknown. <https://historylearning.com/medieval-england/medieval-studies/>

I am a relative newcomer to the world of academia. As a first-time instructor, I assumed that all professors were well versed in pedagogy and were experts in teaching. This proved to be untrue. Professors are experts in their chosen research area. Teaching for many in academia is a necessary part of their job but not their reason for being an academic. These professors rely on the 'sage from the stage' model as the most efficient and expedient means by which they can deliver course material. Asking professors to insert experiential learning into their courses often results in ad hoc activities that have limited connection to course learning outcomes. And while there exist learning centres at universities, professors are often too busy or unmotivated to enroll in teaching workshops. The purpose of this paper is to investigate the apprenticeship model of learning to glean what principles could be applied to active learning and thereby create a theoretical framework that can be used across disciplines to create effective active learning workshops.

2. REVIEW OF LITERATURE

Active Learning

Active learning is an instructional tool where the instructor transfers the responsibility for learning from themselves to their students by way of individual and collaborative activities, with the goal of sustaining interest while achieving the desired learning outcomes through critical thinking and applications of course content [3, 8, 9]. Grounded in a constructivist perspective, active learning activities are an important component in the pedagogical design of a 'flipped classroom'

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(where course content is studied individually outside class, leaving time to engage in active learning activities in class) and usually includes collaborative activities [10]. Prince [10] divides active learning into three learning categories, collaborative, cooperative and problem-solving. In collaborative learning, students work together with a common goal; in cooperative learning students work together but are graded individually; in problem-solving learning significant problems are introduced as motivation and to provide context for learning in a collaborative or cooperative setting. An effective active learning lecture should inspire participation and present a clear, structured curriculum that links to other parts of the course. As Wankat [1] points out, mere non-lecture activity will not positively reinforce learning by students. An active learning module must be thoughtfully incorporated into a complex curricular design to be an effective pedagogical tool. Unfortunately, instructors whose main teaching method is a 'sage from the stage' lecture may be unwilling or hesitant to use a pedagogical tool they are unaccustomed to and may therefore lack the skill and experience necessary to develop an appropriate active learning module.

Apprenticeship

Apprenticeship is a learning model that involves transferring vocational and occupational skills from mentor to protégé. The practice dates back to the Middle Ages where a Master took in a servant and provided the necessities of life in addition to skill training [7]. In England, apprenticeship was codified in 1563 with the passing of the Statute of Artificer. Even though the coming of the Industrial Age and compulsory education reduced the need for apprenticeship practices, it continues to provide, for many students, the transition from school to the workplace where levels of complexity are staged until the apprentice gains occupational and personal maturity [6]. This occurs within a 'community of practice' where seasoned workers pass on their knowledge to newcomers.

Beyond its role as a trade-learning process, apprenticeship is a learning model with several different pedagogical approaches and theoretical frameworks. Griffiths & Guile [11] explored a connective model of learning which they call 'work process knowledge', a model grounded in Vygotsky's [12] 'zone of proximal development' (ZPD) social learning theory. Connectivity refers to the relationship between the individual, the task and the mediation of artifacts which can include texts or other people. The authors state that learning is a mediated process where learners use four practices to navigate the world, namely, the practice of critical thinking to obtain knowledge, be it empirical, narrative or theoretical; dialogic inquiry, where semiotic mediation is used to make sense of the world, especially between two or more people, allowing the novice to learn from the experienced; 'boundary crossing', an idea that just as the ZPD exists in the classroom, it also exists in the work place, but in a more vague, ill-defined way, where learners not only bring their learned knowledge to a task but must mediate between different kinds and levels of expertise, what the authors call 'horizontal development'; and finally, the 'resituation' of knowledge and skill, a practice that fosters different courses of action, new perspectives for a given action. *Work process knowledge* describes the dynamic nature of the workplace, where practical experience in an evolving environment leads to new learning.

As Collins et al [13] note, skills and knowledge being taught in schools since the Industrial Age have become abstracted, creating a gulf between what is learned and what is required to be learned in the workplace. On the other hand, apprenticeship targets the skills required in the workplace, fostering the proficiencies a person will use throughout their work life. The authors promote what they call 'cognitive apprenticeship' to describe a pedagogical method where theoretical and practical knowledge is contextualized within its targeted use. Cognitive apprenticeship focuses on cognitive and metacognitive skills rather than physical skills. This practice is in line with Brown & Palincsar's [14] reciprocal teaching method where teacher and students or students in groups take turns being the teacher. Reciprocal teaching requires expert scaffolding by the teacher in order to create a viable ZPD environment, much like the step-by-step skill training in an apprenticeship environment.

As a model of learning, apprenticeship can be framed by four guiding dimensions –pedagogical, occupational, locational and social [4]. The pedagogical involves a social theory of learning to develop targeted skills and learning outcomes; the occupational involves introducing students to the larger work environment they will be entering and provides context for learning; the locational draws upon co-op learning, internships and volunteer work within one's chosen industry; the social means the fostering of a networked community between learning institutions and the industries that employ their students.

This paper draws upon these four principles to provide a conceptual framework around active learning activities in higher education. By applying these principles as well as Griffith and Guile's [11] work process knowledge model to active learning designs, a reliable framework can be created that ensures these activities link to learning outcomes and promote critical thinking and problem solving. This will be of use to all instructors but especially those charged with teaching students 21st century skills.

3. AN ISSUE – THE MODERN LECTURE

When I think about the recent evolution of classroom teaching, I need not look further than my own career as a student in higher education, a role that spans almost 40 years. My undergraduate and law degrees occurred in the 1970s. My MA degree was obtained in the aughts of the 21st century and my PhD, 10 years later. When I think back to law school I cannot imagine how I survived three years without the internet to look up cases and explain them to me, a smart phone to facilitate this ersatz research, and a computer with which to take notes, to compose papers with and to provide amusement and social interaction. Back then, one took notes by hand, went to the library to read cases and laboriously typed papers on a typewriter, one's fingers stained with white out. In today's classroom there has been a power shift, a cultural and social change that many instructors have had difficulty keeping up with, to the extent they recognize the change at all. That change is the internet.

The modern classroom has been fundamentally altered in the following ways: the proliferation of smart phones coupled with a ubiquitous internet to connect them to; students' reliance on these devices; instructor resistance to the open use of digital devices in the classroom; the waning effectiveness of top-down instruction in the lecture hall. This last point bears

amplification. It is not that lecturing has somehow fundamentally changed in the last couple of decades, rather, it is the building intolerance by students to what they perceive as an ineffectual (boring) waste of their time, which they resent due to an increased perception of fee for service in the minds of students. I recently asked students in a sparsely attended lecture why they bothered to show up. "Because we're paying to have you teach us," was the reply. Whether we as educators like it or not, the university experience has become transactional in the minds of students and their parents. Education for education sake is no longer a much-cherished goal, instead we have students who by and large are only interested in courses and instructors who can deliver the knowledge and skill set they believe they need in the workplace. Enter active learning. But before we can adopt an active learning model in our classrooms, we as instructors have to accept a few truisms that for some, may be hard to accept.

The traditional lecture puts unfair responsibility on the students, where they are cognitively challenged to absorb material, take notes, critically reflect on their previously constructed knowledge while absorbing new incremental material, all the while dependent on the ability of the instructor to effectively teach [15]. What students know and instructors are being forced to accept is that they are no longer the only expert in the room, that knowledge is not scarce, and that they are no longer the only source for reliable information [16]. The internet has laid all of those previous presumptions obsolete. Add to this student intolerance for instructors who 'mail it in', treating the lecture as an information dump, and we have a prescription for our digital-native students to be bored, resentful and unfulfilled in their desire to learn.

4. AN ISSUE – THE MODERN CLASSROOM

Michael Wesch [16], in a 2008 lecture at the University of Manitoba, asked rhetorically, *If the walls of a lecture hall could talk, what would they say?* Wesch lamented the fact that the modern lecture hall, with its rigid seats facing the front of the room reinforces the implication that the instructor is the authority, that one should obey the authority and follow along. The modern lecture hall is not designed to encourage discussion (Fig. 2), which Wesch says creates a cascading problem where students take their lecture experience and migrate it into smaller classes, where generating meaningful discussion proves difficult.

Universities are becoming proactive and building active learning classrooms. This only solves one part of the issue as instructors who find themselves teaching in these rooms often lack the skills necessary to create meaningful active learning modules. It is understandably confusing for instructors, who are aware of various active learning tools – role playing, collaborative research, individual inquiry, scripted and scaffolded curricular designs and participatory software, to name a few – but lack the skill to effectively include these non-lecture activities into their curricular design. What can happen when pressure mounts to incorporate experiential learning into classrooms is the creation of activities that do not connect to learning outcomes and the fostering of skills students seek for their future careers.



Figure 2. The author's attempt to overcome the lecture hall architecture and promote discussion
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5. INCORPORATING APPRENTICESHIP PRINCIPLES INTO ACTIVE LEARNING MODULES

What then makes for a 'good' lecture? Certainly, of vital importance, is an enthusiastic lecturer who is passionate about the subject matter, who can bring a topic to life by way of knowledge and skill and connect it all to real life. Of equal importance is the promotion of critical thinking by encouraging students to engage in deep thinking. These attributes alone however, will not drive class attendance upwards and will not necessarily provide students with the 'hard' skills they seek and the 'soft' skills they need, i.e., the 21st century skills of critical thinking, collaboration, information literacy, social responsibility and metacognition [17].

Active learning is not difficult to initiate, or at least imitate. You can create a problem to be solved, divide students into groups, and have them solve it. You can have groups subdivide into sub-topics and report back to the class or representatives from each sub-group can form new groups to explain each group's sub- topic, a technique called jigsaw [18]. You can use clickers, run pop quizzes or just ask a lot of meaningful questions. But active learning can be much more than this. Mere activity is not active learning, and if used on an ad hoc basis such activity will create only the verisimilitude of active learning. Activities, to be active learning, should be scripted, scaffolded and orchestrated to be effective.

How then, can any instructor be certain that their active learning activities will have the intended effect, i.e., to provide students with the skills and knowledge they need to move forward into the workplace and their adult lives. The following is not meant to be prescriptive. There are many articles that provide this type of advice [3, 8, 9]. Rather, what is described below is a way of thinking about active learning when attempting to incorporate non-lecture activities as part of their curricular design.

6. APPLICATION OF FOUR DIMENSIONS OF APPRENTICESHIP

Based upon Fuller and Unwin's [6] apprenticeship model of learning, the following four principles will be discussed as an analog for an active learning model.

Pedagogical Dimension

Description. The authors first describe the pedagogical dimension, which requires an instructor to embrace a social constructivist framework for teaching. This theory posits that learners construct their own understandings in response to interactions with teachers, their peers, artifacts such as texts, and their broader learning environment. It has come to underlie most modern educational research, influencing curricular design while providing a theoretical basis for evaluating and understanding educational issues and phenomena [19]. The key takeaway from this dimension is that active learning modules, to be considered effective, should lead to the development of new knowledge, theoretical and vocational, which can be applied in the real world.

Applied Approaches. When developing an active learning environment, it is important to be mindful of Vygotsky's [12] zone of proximal development (ZPD). This requires designs that are scripted, scaffolded and orchestrated and works well when groups are assigned a consequential task across the term. We can divide active learning modules into two categories, long term and short term. Long term approaches usually include a consequential task that is given to a group for a period of time – even for the entire term. Short term tasks would reinforce the topic contained in a given lecture. Whether the active learning modules are long term or short term, workshop activities that emulate real-life and are linked to industry and the workplace will be perceived by students to be worthwhile activities.

Examples. In Ehrlick & Slotta's [20] study of a learning community approach in large lectures, students in a business course were required to create a company and generate a business plan. Tutorials were scripted and scaffolded so that student officers of the company developed the necessary expertise over time to create a realistic plan by the end of the term, resulting in the acquisition of skills in finance, marketing and sales. As another example, Eisen [21] describes the use of student presentations as a way to shift responsibility for learning to the students and increase science literacy. Students read articles from the primary biology literature that are selected by the instructor to cover the standard topics of cell biology textbooks, present the material to the class, and coordinate the question-and-answer period.

Occupational Dimension

Description. The second dimension is the occupational. The authors use this dimension to describe an apprentice's initiation into the larger trade community, including unions and guilds. The key takeaway from this dimension is the importance of introducing students to professionals in the workplace community or environment they wish to emulate after graduation.

Applied approaches. Applying the occupational dimension to active learning can be achieved through domain-specific guest lectures or field trips to workplace locations to name two. It is

important for instructors to be strategic in their choice of guests and field trip locations. For example, instructors often make use of guests, but in a guided guest lecture, the guest is not left on their own, rather, they are interviewed, with the instructor directing the discussion. Secondly, the choice of guest is important. While instructors normally invite experts from the field, in the active learning classroom it is vital to select guests who can help students expand their ZPD. Why are guests important in the active learning context? Brown & Campione's [22] research into learning community indicated that students may hit a wall of understanding, perhaps inventing what seem like objective but mistaken conclusions. A domain-specific expert can rectify these mistakes and provide students with not only an expert in the room but someone who they can communicate with electronically long after the guest experience.

Examples. In a music business class I teach where students work with actual music artists throughout the term, a visit to a recording studio not only allows audio students to hear from a domain-specific expert and spend time working with state-of-the-art recording equipment, they also gain understanding of the lives of the artists they are working for and the people who work in audio production, having gained access to the secluded environment of the music studio. Likewise, biology students could visit an industry wet lab as part of their active learning module; a business class might benefit from a visit to an accountancy firm. Whether a studio visit or a guest appearance, it is important to always link these activities back to the active learning module. While outside the scope of a single course, plugging student activities into an existing mentorship program would also provide them with high level and ongoing expertise as they work through their ongoing active learning tasks.

Locational Dimension

Description. The third dimension is the locational. This dimension at first glance seems similar to the occupational dimension, the difference being that the occupational links students to more seasoned persons in their chosen career area, while the locational describes the nexus between the employers who will hire and the community in which they reside, allowing apprentices (students) access to the wider community. The key takeaway from this dimension is that instructors must look beyond the campus and consider which industry(s) are most likely to employ their students.

Applied Approaches. When considering how this dimension should be reflected in active learning decisions, it is important to note that most universities are situated in major population centers, which likely have industries that match with the subject an instructor teaches. Creating a link between active learning activities and the larger community, especially those with a culminating consequential task, will create buy-in from students as they recognize the nexus between the activities in class and how those activities have real-life implications once they find themselves in the community. Again, specific approaches in an active learning course can include guest visits and field trips; however, the idea here is to expose students not just to domain-specific skills as in the occupational dimension above, but rather to the broader facets and perspectives of the industry they will be entering into.

Examples. The music industry course I mentioned above is taught in Toronto, the center of the Canadian music industry.

When students work with real artists they are also in contact with managers, music labels and publishers. Active learning activities are designed with a bridge to the broader music community. In other contexts, a fashion class could connect to an upcoming fashion show in their city, while an architecture class could introduce students to architecture associations at the provincial or federal level.

Social Dimension

Description. The final dimension is the social. This dimension describes the symbiotic relationship between employers and their apprentices. It is a perceptual situation, where employer success positively reflects on the value of apprenticeship. Importantly, the successful partnership of employer and apprentice promotes the perception by a community that apprenticeship is assisting young people from economic dependence to independence on the avenue to adulthood [23]. The key takeaway from this dimension is that instructors need to be mindful of the reputation of their institution and use the goodwill generated to foster relationships in the community for their students.

Applied Approaches. In the active learning setting, successful linking of the occupational and locational dimensions creates goodwill, where a course, a school, or a university creates a favourable impression with prospective employers, who over time will have positive opinions of an institution's ability to graduate quality students for the workforce. This is a big picture consideration, and instructors busy with their courses may neglect or be unaware of the goodwill their course and school is generating in the community. Part of the success of a course as perceived by the student population is its relevance, and this is reinforced by a feedback loop; when quality students are hired, employers seek students from that course or school, and when employers hire from that course or school, students gravitate to said courses and schools. Maintaining the lines of communication between the institution and the larger community is thus beneficial to the perceived value of the course. At a more granular level, an instructor can promote this dimension by the choice of guest they bring into the classroom, as well as liaising with companies for research, internship and potential new guests in order to keep the course on that community's radar.

Examples. Examples will depend on elements beyond an individual instructor's control. But it is important to be mindful of the reputation of the university and tap into it. Ryerson University, for instance, is known for prioritizing experiential learning. Knowing this, instructors can plan active learning activities knowing that when they reach out to the industry for guest lectures, field trips or mentors, the university's reputation will have preceded them.

7. CONCLUSION

As the Fuller & Unwin [6] state, apprenticeship as a model of learning is more than a metaphor. Once its tenets are incorporated, it becomes part of people's lives, reflected in their work and in the community. Likewise, active learning modules grounded in real-life activities, supplemented with domain-experts and connected to industry and the community-at-large will attract students, imbue them with skills that cannot be delivered in lectures only, and will be in service of the intended learning outcomes of the course.

A person's journey from experience to knowledge usually commences with top-down instruction but to crystallize, at some point on the journey, practical experience must be introduced. Without it, moving from theory to practice becomes an existential, ephemeral exercise. It is only in the work context that a person can draw upon two types of knowledge, the practical and the theoretical, combining them together so that one informs the other [11]. Active learning provides a safe environment where students 'practice' by being immersed in real-life scenarios and concurrently gain in skills and knowledge of the subject matter. The importance of active learning in the classroom is not solely to provide students with emulations of the workplace, and the absorbing of skills. Of equal importance are the theoretical understandings and the conceptual digestion of the 'lingua franca' of a given workplace in order to understand the underpinnings of the subject matter at hand and to seek new knowledge, new ways of doing things to disrupt the status quo. A student's ability to conduct dialogic inquiry in order to think critically about the theoretical concepts that wrap a given subject still requires that 'sage from the stage' to serve as the conduit, from unawareness to understanding, and for that the instructor remains indispensable. By combining theory and practice, by understanding theory and being able to apply it, a more fully formed student may enter the workplace with the requisite skills and knowledge to succeed.

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