Education in Action: 
Active Learning in University Courses

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This paper is the first in a series of submissions addressing general teaching methods and practices, educational technologies, and learning issues in Japanese university settings from a variety of pedagogical perspectives. This installment focuses on examples of the indirect instruction method of active learning, its origins, characteristics, advantages, disadvantages, and applications in tertiary-level courses.

1. Introduction

Educators and learners alike serve to benefit from inquiry into the nature of learning. A UNESCO education resource addressing ‘influential theories of learning’ notes that our recent understanding of the nature of learning started with 20th century scientific studies that gave rise to theories and concepts such as “behaviorist theories, cognitive psychology, constructivism, social constructivism, experiential learning, multiple intelligence, and situated learning theory and community of practice” (UNESCO, 2017). Active learning derives from constructivism theory and, as with all constructivist perspectives, education is ‘learner-centered’ and the “the teacher becomes a cognitive guide of student learning instead of a knowledge transmitter” (Dumont, 2010).

As far back as a century ago, philosopher and education reformer John Dewey stressed the constructivist nature of the learning process and its fundamental connection with the existing experiences of the learner: “education must be conceived as a continuing reconstruction of experience; that the process and goal of education are one in the same thing” (Dewey, 1974). The 20th century saw dramatic leaps forward in information and communications technology and a significant furthering of our understanding of the nature of learning. Throughout the course of these advancements, the longstanding ‘direct instruction’ style of education became the
target of increased scrutiny and investigation. Direct instruction, as opposed to 'indirect instruction', generally involves an instructor explaining or demonstrating a skill to learners who absorb the knowledge passively. Educational researcher K. Patricia Cross points out, "when students are actively involved in the learning task, they learn more than when they are passive recipients of instruction" (Cross, 1987).

On one side of the spectrum we find teacher-centered methods of direct instruction characterized by 'passive learning'. On the opposite side we find learner-centered methods of indirect instruction characterized by 'active learning'. Time-honored methodologies of passive learning are now considered by many education researchers and education psychologists to be inferior to active learning approaches in terms of effectiveness, relevance, and students' retention of knowledge. A great deal of scholarly work and research exists citing the benefits of indirect instruction methods such as active learning and 'experiential learning' (learning through experience), which are both characterized by students being actively engaged in their own learning processes. Although direct and indirect instruction methods tend to be set apart as opposing paradigms, educators should keep in mind that both approaches share common ground, both have inherent value, and both approaches can be employed in conjunction in a lesson without one being completely neglected at the expense of the other.

The teacher-centered direct instruction paradigm has provided the framework for contemporary tertiary level education. Direct instruction allows for an individual teacher to simultaneously communicate to a potentially large student audience. Student input, teacher feedback and other interactions are minimized thereby making the direct instruction process comparatively time-efficient. Naturally this style of instruction suits institutions with large student enrollments, yet it is by no means the intention of the author to negate the inherent value of direct instruction or teacher-centered approaches. Nevertheless, direct instruction comparatively permits little one-on-one interaction and could perhaps be called the hallmark of mass schooling in that it is a practical approach when dealing with large numbers of students or satisfying institutional goals.

In the 1980s the benefits of active learning were heralded by educational researchers such as A. W. Chickering and Z. F. Gamson: "Learning is not a spectator sport. Students do not learn much by sitting in classes listening to teachers, memorizing pre-packaged assignments, and spitting out answers. They must talk about what they are learning, write about it, relate it to past experiences, apply it to their daily lives. They must make what they learn part of themselves." (Chickering & Gamson, 1987). Regardless of the individual teacher's predilection for direct or indirect methods of instruction, active learning certainly offers a shift from the traditional paradigm towards increased student participation and a heightened sense of learner responsibility. Ideally, active learning approaches in university classes can offer more opportunities for both teacher-student and student-student interaction thereby challenging the preconceptions of both
teachers and students alike.

2. Discussion and considerations

As previously outlined, active learning draws its basis from the theory of constructivism. The aforementioned UNESCO resource explains “constructivism emerged in the 1970s and 1980s, giving rise to the idea that learners are not passive recipients of information, but that they actively construct their knowledge in interaction with the environment and through the reorganization of their mental structures. Learners are therefore viewed as sense-makers, not simply recording given information but interpreting it.” (UNESCO, 2017). Therefore, from this constructivist perspective, students take in new knowledge and process it based on their existing knowledge and experiences and ‘construct’ their own understandings. While active learning finds its roots in constructivism, educators and learners alike must consider what constitutes ‘passive’ and ‘active’ learning. The paradigms are somewhat ambiguous and subjective, leaving doubt as to the definitions of direct and indirect instruction, with many decisions ultimately being left to the discretion of the individual instructor.

Although active learning is commonly featured in contemporary education reform movements, the pedagogical method itself is by no means radical or groundbreaking, as educators have always had a variety of alternative approaches to direct instruction at their disposal. Two alternative indirect instruction methods stemming from contemporary discovery learning theory are ‘enquiry-based learning’ and ‘problem-based learning’. Yet even these methods both contain parallels with the well-known Socratic method of teacher-student dialogue in which the teacher serves as a guide for students, asking them questions to exercise their critical thinking and reasoning skills and leading them to discover the answer for themselves through peer discussion. Various pedagogies such as ‘peer learning’, ‘cooperative learning’ and ‘collaborative learning’ all feature student-centered learning designed to increase learner autonomy and exercise practical skills that are applicable in the real world. Learners who are shown how to be their own teachers are availed the benefits of lifelong learning. The common ground in these various pedagogies is a high level of learner engagement made possible by increased student-teacher and student-student interaction.

The following are examples of contemporary US and Japanese education reform guidelines in which the benefits of active learning are cited with a view to developing the ‘critical thinking’ skills of students.

In 2012 attention was refocused on active learning in the Engage to Excel report authored by the President’s Council of Advisors on Science and Technology for US President Obama. The report states: “classroom approaches that engage students in ‘active learning’ improve retention of information and critical thinking skills, compared with a sole reliance on lecturing” (PCAST, 2012, p.iii). Despite the report’s focus on the subject fields of science, technology, engineering and mathematics, its cited studies involving active student engagement demonstrate increases in ‘retention of information’, ‘critical thinking
skills’, ‘positive attitudes toward disciplines’, ‘student (enrollment) retention’, ‘coverage of content’, ‘deep understanding’, and ‘student attendance and enthusiasm in class’ (PCAST, 2012, p.17). The report then outlines the benefits of educators employing a variety of teaching approaches in their classes as opposed to simply relying on direct instruction and passive learning style pedagogies.

In Japan, as recently as 2014, the Ministry of Education, Culture, Sports, Science and Technology (MEXT) released education reforms prominently featuring active learning for high schools and universities. The reforms from the Higher Education Bureau’s Policy Planning Division are outlined in a report entitled “Integrated Reforms in High School and University Education and University Entrance Examination Aimed at Realizing a High School and University Articulation System Appropriate for a New Era”. In regards to high school education in Japan, the report highlights active learning as a key missing component at present by clearly identifying the need to “massively improve proactive and cooperative learning and instruction methods focusing on the discovery and resolution of issues” (MEXT, 2014, p.2). In regards to university education in Japan, the report outlines the Ministry’s intention to “promote a qualitative transition to active learning, where students can study while proactively cooperating with a diverse variety of people” (MEXT, 2014, p.3).

Both of these US and Japanese education reform guidelines indicate a recent and international trend towards the utilization of active learning principles in secondary and tertiary education.

3. Common characteristics of active learning strategies

Despite certain ambiguities and subjectivity regarding what constitutes active learning, the following are some generally acknowledged characteristics.

- A shift in focus from lecture-driven and teacher-centric classes to students being proactively engaged in their own learning process and that of their peers.
- More freedom and responsibility being placed on the student to participate in their own education and therefore the teacher being seen less as an imparter of knowledge but rather as a guide who allows students to discover solutions for themselves.
- Students being challenged to conceptualize the lesson material for themselves and use their own logic and reasoning to rationalize the content or solve a problem.
- A shift away from methods such as rote learning, cramming, or preparing students for standardized tests, to goals such as developing critical thinking and problem solving skills for real world applications.
- Applying preexisting but often underutilized methods of inquiry to develop learner autonomy in students, enabling them to independently learn without an instructor.

It is clear that students constructing knowledge for themselves rather than acquiring it from an instructor directly connects with the constructivist roots of active learning. By employing proactive
methodologies and encouraging students to become self-motivated learners, students can ideally be lead towards making sense of course material with their own reasoning, logic, and experiences.

4. Typical advantages of active learning strategies

The following are some typically cited benefits of active learning.

- Students are encouraged to be more aware of the learning process rather than simply focusing on course content.
- Students who have chances to apply facts and knowledge and conceptualize material for themselves benefit from ‘deep learning’ and ‘authentic learning’ and ideally will have a greater appreciation of the course’s value and a desire to learn more.
- Students are encouraged to become autonomous learners and this independence in knowledge acquisition fosters the skills for lifelong learning.
- Students’ analytical and critical thinking skills are further activated, better preparing them to face the diverse situations and problems they will encounter on entering the workforce.
- Active learning is considered to be more engaging and intellectually stimulating than direct instruction methods for both learners and instructors alike. For instructors it offers a change in pace from the potential monotony of preparing and repeatedly delivering lectures in a non-interactive format.
- Teamwork and leadership skills are enhanced through peer and group work.
- Students have the chance to share and test their opinions and ideas with smaller groups before sharing them with the entire class. This can alleviate some of the trepidation of addressing a potentially large group.
- The face-to-face communication and group discussion skills of students are improved along with presentation and public speaking skills.
- It is more difficult for shy, standoffish, or unmotivated students to avoid participation or discussion because of the group work style of the classes and increased monitoring by the teacher.
- Students looking up something for themselves will have a higher retention of knowledge than if the instructor were to verbally inform them, or show them in a slide or textbook.
- Increased interaction with students allows the teacher to better ascertain ability level and progress rather than simply relying on perceived impressions or previous records of student performance.
- Less addressing the entire class means that the teacher has more time and freedom to give feedback and talk to students individually. This can also lead to better class control and improved teacher-student relations.
- An active learning style activity or course could potentially mean less preparation for a teacher.
- A greater sense of student responsibility to peers or workgroups will ideally lead to a decrease in absenteeism and tardiness.
The number of students in each workgroup and the number of groups can theoretically be changed to account for any number of students.

Less reliance on traditional class formats and formalities will ideally lead to increased creativity, exploration and expression from both students and teachers.

By combining active learning strategies with instances of 'authentic learning', teachers will ideally be able to provide more enjoyable, memorable, and practical lessons for their students.

As featured in this list, 'critical thinking skills' and 'deep/authentic learning' are often cited as the main advantages of active learning strategies. Instructors or institutions interested in employing these strategies may consider investing in high-tech active learning classrooms (ALCs), however it must be noted that an instructor does not necessarily require a specially equipped classroom to utilize active learning principles; with some modifications, the workgroup system can be employed even in a large lecture hall with fixed seating.

5. Typical disadvantages of active learning strategies

Changing teaching approaches from methods of direct instruction to indirect instruction can pose many challenges. The following are some of the potential pitfalls of active learning.

Particular courses, subject matter, or specialized fields of study might not lend themselves entirely to indirect instruction methods.

A great deal of planning and material preparation may be required of the teacher to ensure a smooth transition to student-centered learning.

It may prove time-consuming or troublesome for teachers to fully familiarize themselves with and to begin incorporating active learning. Both faculty and students will most likely need time for adjustment.

Certain activities may require significant out-of-class preparation for students. Absent students may have difficulty in catching up on missed classwork.

There is a possibility of resistance if active learning is seen to risk hindering the targets or goals of an institution.

With extra responsibility placed on students, there may also be an issue of teacher accountability if targets or goals of an institution are not met.

Striking a balance between the direct and indirect instruction components of a lesson can prove difficult and brings with it the risk of potential time-management problems. Hence, material may not be covered at a quick enough pace to satisfy all requirements of the course.

Performance assessment or the grading of skills acquired through active learning may require unique testing or evaluation methods.

Certain group work activities may involve reconfiguring desks and chairs multiple times throughout a lesson.

Although active learning can be implemented with a large number of students, smaller and more manageable classes ensure the most prompt and
precise instructor feedback. If the number of students in a class is excessively large, teaching assistants may be required for classroom management or technical support.

- Close interaction between students in certain activities can result in peer relationships becoming stressed, group friction, or problems between individuals. A high level of group cohesion and teamwork is required which also means issues of workload and fairness may arise.

- If a comprehensive active learning approach is to be adopted by an education institution, a number of classrooms may need to be physically redesigned into active learning classrooms (ALCs), and new equipment or ICT technologies may need to be purchased at significant cost.

This list outlines some of the general risks of employing an active learning approach. As Section 4 and Section 5 of this paper show, there are a significant number of issues to be considered before incorporating indirect instruction, so ideally teachers should consult their supervisors or institution before making any comprehensive changes.

6. Specific examples of active learning activities

The aforementioned Engage to Excel report outlines 12 examples of tasks that were demonstrated to actively enhance learning by utilizing teacher and peer feedback and increasing student participation in the learning process. These are (1) small group discussion and peer instruction, (2) testing, (3) one-minute papers, (4) clickers, (5) problem-based learning, (6) case studies, (7) analytical challenge before lecture, (8) group tests, (9) problem sets in groups, (10) concept mapping, (11) writing with peer review, and (12) computer simulations and games (PCAST, 2012, p.17)

The following is a list of other indirect instruction activities that facilitate active learning in university classes.

- Academic discourse that involves teacher-student interaction and student-student opinion exchange such as group discussion, brainstorming, and debate.
- A lecture modified into an open and interactive discussion with immediate teacher feedback.
- Prompting students with questions or posing problems that they must think about individually or within a group as in problem-based learning.
- Examining real life applications through technical simulations or group roleplaying.
- Solo and pair work in which students reformulate their own ideas and opinions after sharing them with a partner as in ‘think-pair-share’ activities.
- Forming students into ‘learning teams’ with roles and responsibilities to the group or class such as researching, writing a report or making a presentation. This may include cooperative learning practices such as the ‘jigsaw method’ of collaboration and group work.
- Project-based tasks or team fieldwork in which students experience real world situations firsthand and ‘learn through
doing'.

- Empowering students to take teaching roles within their learning team or group and ‘learn through teaching’.
- Allowing students to contribute to or control part of the lesson via explaining material to their peers, writing on whiteboards, using the classroom projector etc. instead of the instructor.
- Reflection activities or worksheets for students to discuss, summarize, and make sense of course material in their own words.
- Experiential learning exercises involving application and review.
- ‘Flipped classroom’ scenarios with class time increasingly freed up for hands-on activities, collaboration, group work, or open discussion.
- Students learning from their own mistakes, sharing their own mistakes with a peer, and learning from peers’ mistakes.
- Quizzes, polls, surveys or electronic clicker activities allowing individuals or groups to evaluate their understanding or progress against that of their peers.
- Students creating interactive mind maps, flowcharts or other visual representations to enhance their understanding of core concepts. Creating these on whiteboards with magnets, paper, whiteboard markers and erasers allows groups of students to interact with and easily alter the design of these visualizations.
- The act of students looking up something in a dictionary, reference book or online resource rather than the teacher just providing them with the answer constitutes active learning in a simple form.

7. Conclusion

Active learning presents educators with a teaching approach that challenges traditional direct instruction methodology and the fundamental role and responsibilities of teacher and student in the learning process.

Active learning promises a progressive shift in education paradigms while maintaining a sound base in educational psychology principles. If active learning really does enhance critical thinking skills and bolster learner autonomy, then its short and long term benefits are certainly alluring. Despite the many cited advantages of active learning, we cannot overlook the fact that it entails a marked shift in learning responsibility and, therefore, full incorporation of active learning naturally presents a myriad of challenges for faculty, students and the institution concerned.

In the absence of institutional guidelines, the individual instructor is left to judge the value and practicality of active learning for themselves and their students. The author encourages teachers to incorporate active learning tasks in their classes on an experimental basis and compare students’ performances and results. The implementation of active learning does not need to be sudden or all-encompassing; a balanced blend of both direct and indirect instruction methods might be more appropriate in certain courses, and small changes made gradually over time would aid in teacher and student adjustment.
References


教育法の考察
～大学授業におけるアクティブ・ラーニング～

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Synopsis 邦訳
本稿は、教育学の視点から日本の大学における教育法、教授法、教育技術、そして学習に関わる様々な話題を扱うシリーズの第1編である。本編は、能動的学習法であるアクティブ・ラーニングの由来、特徴、実践事例、長所、短所、また大学授業での活用に焦点を当て考察を入れながら議論を進める。

キーワード
アクティブ・ラーニング、主体的学習、教育法、構成主義理論、オーセンティック・ラーニング

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