



Australia's  
Global  
University

Learning Environments  
Office of the Pro Vice-Chancellor Education  
and Student Experience

# Active Learning Reference and Research Resource

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## TOPIC 1

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# Research into active learning [annotated papers]

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This section provides annotated references to topical articles and the references to them.

[The Active Learning in Higher Education Journal<sup>\[1\]</sup>](#) is an extremely useful reference source.

### Class sizes

Does alignment between intended and enacted teaching strategies impact?

Wright, M. C., Bergom, I., & Bartholomew, T. (2019). Decreased class size, increased active learning? Intended and enacted teaching strategies in smaller classes. *Active Learning in Higher Education*, 20(1) 51-62.

### Various definitions of the active learning concept

Active learning (AL) is a broad concept associated with a variety of learning and teaching strategies intended to improve students' higher level learning. Such strategies include problem-based learning, self-regulated learning, inquiry-based instruction/ inquiry-guided learning, collaborative learning, experiential learning, blended learning and flipped classrooms (Carr, Palmer & Hagel, 2015; Nicol et al., 2017).

Carr, R., Palmer, S., & Hagel, P. (2015). Active learning: The importance of developing a comprehensive measure. *Active Learning in Higher Education*, 16(3), 173-186. doi: 10.1177/1469787415589529

Nicol, A. A. M., Owens, S. M., Le Coze, S. S. C L., MacIntyre, A., & Eastwood, C. (2018). Comparison of high-technology active learning and low-technology active learning classrooms. *Active Learning in Higher Education*, 19(3), 253-265. doi: 10.1177/1469787417731176

The focus of AL is on developing students' skills rather than transmission of information. Hence, AL represents a paradigm shift away from traditional notions of 'teaching as telling' (i.e. teacher-centered approaches), towards more student-centered ones. It promotes a 'learning by doing' approach (e.g., discussing, reading, writing, participating in learning activities) which engages students higher-order thinking skills, and thus the development of more complex knowledge structures (Grabinger & Dunlap, 1995).

Grabinger, R. S., & Dunlap, J. C. (1995). Rich environments for active learning: A definition. *ALT-J*, 3(2), 5-34. doi: 10.1080/0968776950030202.

### Increasing student engagement

AL is important, measured by the [\(AUSSE\) Australasian Survey of Student Engagement<sup>\[2\]</sup>](#) Research into AL classrooms report high student engagement (Vercellotti, 2017), increased student motivation (Owens et al., 2017) and performance (Freeman et al., 2014).

Freeman, S., Eddy, S.L., McDonough, M., Smith, M.K., Okoroafor, N., Jordt, H., & Wenderoth, M.P. (2014). Active learning increases student performance in science, engineering, and mathematics. *Proceedings of the National Academy of Sciences USA* 111, 23, 8410-8415.

Owens, D. C., Sadler, T. D., Barlow, A. T., & Smith-Walters, C. (2017). Student motivation from and resistance to active learning rooted in essential science practices. *Research Science Education*, 1-25. doi: 10.1007/s11165-017-9688-1

Vercellotti, M. L. (2018). Do interactive learning spaces increase student achievement? A comparison of classroom context. *Active Learning in Higher Education*, 19(3), 197-210. doi: 10.1177/1469787417735606

### Research into inquiry based and collaborative/cooperative learning can lead to higher scores than traditional lecture pedagogy

Foldnes, N. (2016). The flipped classroom and cooperative learning: Evidence from a randomised experiment. *Active Learning in Higher Education*, 17(1), 39-49.

### Research into AL classrooms report high student engagement, but this could be compounded by the AL pedagogy teachers use (i.e. more active teachers are, higher is the level of engagement).

Vercellotti, M. L. (2017). Do interactive learning spaces increase student achievement? A comparison of classroom context. *Active Learning in Higher Education*, 19(3), 197-210. doi: 10.1177/1469787417735606

### Success with discussions

Success with strategies such as discussion and group-based activities has been demonstrated in classrooms ranging from 15 to 50 students (Baepler & Walker, 2014); whilst engagement in small or large classrooms can show differences (Bolden et al., 2019).

Baepler, P., & Walker, J. D. (2014). Active learning classrooms and educational alliances: Changing relationships to improve learning. *New Directions for Teaching and Learning*, 137, 27-40. doi:10.1002/tl.20083

Bolden III, E. C., Oestreich, T. M., Kenney, M. J. & Yuhnke Jr, B. T. (2019). Location, location, location: A comparison of student experience in a lecture hall to a small classroom using similar techniques, *Active Learning in Higher Education*, 20(2), 139-152.

### Technology switches?

Effect of using smartphones as clickers and tablets as digital whiteboards.

Remón, J., Sebastián, V., Romero, E., & Arauzo, J. (2017). Effect of using smartphones as clickers and tablets as digital whiteboards on students' engagement and learning. *Active Learning in Higher Education*, 18(2), 173-187.

### Investing in active learning

Christersson, C., Staaf, P., Braekhus, S., Stjernqvist, R., Pusineri, A.G., Giovani, C., Sancassani, S., Corti, P., Lebigot, G., Biri, V. & Mainelli, X.U. (2019). Promoting active learning in universities. Retrieved 17 November 2019 from <http://bit.ly/cora-ucc-ie>

#### Links

<sup>1</sup> [www.bit.ly/higher-education-journal](http://www.bit.ly/higher-education-journal)

<sup>2</sup> [www.bit.ly/ausse-als](http://www.bit.ly/ausse-als)

## External tools

For many subjects, textbook providers may have supportive online resources. For example, students in a maths class may benefit from a MyStatLab learning environment where they can do quizzes or watch interactive applets before they come to classes. By curating these resources, you can focus on your key content points and identify any learning misconceptions. You might decide to demonstrate in the first class how students can access these resources. Another enabling technology that can be used in any learning space with Internet access is myAccess. For example, you might decide to undertake a MAPLE 18 demonstration of differential calculus in a lecture, and then in the same lecture, invite students to form groups to analyse and provide solutions to similar examples.

Students can use the [myAccess service<sup>\[1\]</sup>](#) to run specialised virtual software applications wherever they have Internet access. Other applications include AutoCAD, MYOB, NVivo Pro, SAP, tNavigator, IBM SPSS Modeler, Foodworks, and Arena. [Instructor resources<sup>\[2\]</sup>](#) for using myAccess include Getting Started Slides, course outline materials, a student email template, and a student Moodle announcement template.

## TOPIC 2

# References for activities in Active Learning Guide v2.0

Bolden III, E. C., Oestreich, T. M., Kenney, M. J. & Yuhnke Jr, B. T. (2019). Location, location, location: A comparison of student experience in a lecture hall to a small classroom using similar techniques, *Active Learning in Higher Education*, 20(2), 139-152.

Bonwell, C. C. (1997). Using active learning as assessment in the postsecondary classroom. *The Clearing House*, 71(2), 73-76.

Carr, R., Palmer, S., & Hagel, P. (2015). Active learning: The importance of developing a comprehensive measure. *Active Learning in Higher Education*, 16(3), 173-186. doi: 10.1177/1469787415589529

Churchill, D., Fox, B., & King, M. (2016). Framework for designing mobile learning environments. In D. Churchill, J. Lu, T. K. F. Chiu, & B. Fox (Eds.), *Mobile Learning Design: Theories and Application* (pp. 3-26). New York: Springer.

Dutill, J., & Wehler, M. (2017). *Microlecture Template*. The Online Lecture Toolkit. Retrieved 17 November 2019 from <https://www.onlinelecturetoolkit.com/microlecture>

Freeman, S., Eddy, S. L., McDonough, M., Smith, M. K., Okoroafor, N., Jordt, H., & Wenderoth, M. P. (2014). Active learning boosts performance in science, engineering, and mathematics courses. *Proceedings of the National Academy of Sciences*, 111(23), 8410-8415. doi: 10.1073/pnas.1319030111

## Links

<sup>1</sup> [www.bit.ly/my-access-als](http://www.bit.ly/my-access-als)

<sup>2</sup> [www.bit.ly/instructor-resources-als](http://www.bit.ly/instructor-resources-als)

Grabinger, R. S., & Dunlap, J. C. (1995). Rich environments for active learning: A definition. *ALT-J*, 3(2), 5-34. doi: 10.1080/0968776950030202.

Lamb, G., & Shraiky, J. (2013). Designing for competence: Spaces that enhance collaboration readiness in healthcare, *Journal of Interprofessional Care*, 27(2), 14-23.

Nicol, A. A. M., Owens, S. M., Le Coze, S. S. C L., MacIntyre, A., & Eastwood, C. (2018). Comparison of high-technology active learning and low-technology active learning classrooms. *Active Learning in Higher Education*, 19(3), 253-265. doi: 10.1177/1469787417731176

Owens, D. C., Sadler, T. D., Barlow, A. T., & Smith-Walters, C. (2017). Student motivation from and resistance to active learning rooted in essential science practices. *Research Science Education*, 1-25. doi: 10.1007/s11165-017-9688-1

Petersen, C. I., & Gorman, K. S. (2014). Strategies to address common challenges when teaching in an Active Learning Classroom. *New Directions for Teaching and Learning*, 137, 63-70. doi: 10.1002/tl.20086.

Steel, T. C., & Andrews, T. (2011). Re-imagining teaching for technology-enriched learning spaces: An academic development model. In M. Keppell, K. Souter, & M., Riddle (Eds.), *Physical and virtual learning spaces in higher education: Concepts for the modern learning environment*, 242-263. doi: 10.4018/978-1-60960-114-0.ch015.

Steen, S., Vasserman-Stokes, E., & Vannatta, R. (2014). Group cohesion in experiential growth groups. *Journal for Specialists in Group Work*, 39(3), 236-256.

Tisdell, C. (2017). Fostering employability skills through the T-shaped student in science, mathematics and medical science. *ACSME Proceedings*, 21st Century Science and Maths Graduate, 232-238.

UNSW. (2015). *UNSW 2025 Strategy: Our Strategic Priorities and Themes*. Sydney.

Vercellotti, M. L. (2018). Do interactive learning spaces increase student achievement? A comparison of classroom context. *Active Learning in Higher Education*, 19(3), 197-210. doi: 10.1177/1469787417735606

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## TOPIC 3

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# Active learning references to UNSW 2025 Strategy

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### Theme A2: Educational Excellence – the UNSW Scientia Educational Experience

#### 3. Systematically integrating technology into teaching

We will develop a culture that allows us, through our integrated digital campus strategy and investment in technology, to innovate and improve our educational capabilities. This will enhance both the educational experience and campus life more generally. We will integrate the best available technologies to design and deliver systems that enable students to personalise their education and allow the University to individualise student support programs. We will ensure coordination of University-wide support services for flexible use of learning spaces and integrated technology. Alongside the investment in new technology enabled solutions, we will disinvest from those activities and technologies that are not adding value or where better solutions exist.

#### Enabler D3: World-class environments 2025 Vision

Our University environments will provide a sense of place and pride in UNSW. We will have an outstanding set of connected places, physical and digital, where students, staff, alumni, members of the local community and our diverse range of partners, can come together to innovate, transform, learn and contribute to society. Our objectives are to:

1. Integrate our physical and digital campuses to provide a worldclass environment, flexible in adapting to changing circumstances.
2. Provide a campus environment that promotes safety, social engagement, accessibility and collaboration, and that contributes to environmental sustainability.
3. Provide a holistic individualised experience utilising the physical and digital assets of UNSW and providing fully integrated services to students and staff.

#### 1. Campus development

UNSW will develop a physical campus development strategy that focuses on providing contemporary spaces and facilities that will meet student and staff needs, create a vibrant community of activity and that are safe, accessible and environmentally sustainable. We will utilise the completion of the new Light Rail project to open up new opportunities to connect our campus to the city of Sydney.

#### 2. Digital solutions

UNSW will ensure our staff and student service systems and practices offer digitally enabled solutions that meet individual needs, are readily accessible, and provide efficient and effective advice and assistance.

#### 3. Integration of the physical and digital campus

We will design our physical and digital campus to achieve a seamless integration in the experience of staff and students in a way that is flexible enough to accommodate rapid change.

Measures of our progress include:

- Increases in the scale of world-class shared research infrastructure.
- Benchmarking against other Australian universities for service access and quality in digital/Information Technology service delivery.
- Student and staff satisfaction with our physical and virtual environments.
- Benchmarking against other Australian and international universities for space utilisation.

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