# The Flipped Classroom: A Research Perspective

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## Overview

The expectation of a learner in a traditional classroom is of a professor, a content expert, delivering the content to learners in some version of a lecture – with PowerPoints, handouts, and textbook readings – to be followed up by a homework assignment. The flipped classroom, conversely, asks the students to engage with the content of the lecture before attending class. This is then followed up in class with activities focused on delving deeper into the content.

There are many definitions of the flipped classroom. The following one is useful:

The flipped classroom is characterized by course structure: instructional content is assigned as homework before coming to class. In-class time is then spent on advancing concepts, working on problems and engaging in collaborative learning. (Findlay-Thompson and Mombourquette, 2014).

The flipped classroom is a concept that has been around for many years (Tucker, 2012). Importantly, there is no one way to flip a classroom (DeLozier & Rhodes, 2017). It is part of an overall approach to better engage learners with the content, to raise the level of their learning and to invoke active learning opportunities (DeLozier & Rhodes, 2017). The flipped classroom is not a singular approach. Rather, it opens up a multitude of other opportunities for learner engagement in the synchronous classroom and in asynchronous activities.

Learning is at its core a social activity. We learn through our interactions and communications with others (Vygotsky, 1978). Even when one is “learning on their own”, the way the instruction is designed creates a dialogue between the instructional artifact and the learner. Notes are taken, papers are written, arguments are developed all based on the interactions of the learner with others. The implication is that the more that learners interact and communicate – with the professor, with each other and with artifacts - the more they will learn and the deeper they will learn.

The flipped classroom relies on these basic principles of learning. The classroom becomes learner centered (Perez, et.al. 2019; Huang & Lim, 2017). Engagement becomes the coin of the realm (Perez et.al. 2019). Reviewed studies indicate that the flipped model promotes student learning performance, motivation and positive attitudes (Akçayır & Akçayır, 2018).

The role of the professor shifts from delivering content in a classroom to delivering it in other formats that can be interacted with by the learner asynchronously. Research has compared lecture formats – traditional, virtual and e-lecture – and found that the delivery method of the format of instructional content does not substantially influence learning (DeLozier & Rhodes, 2017). Test performance was similar regardless of lecture format (Francl, 2014).

In the flipped classroom, the professor is still the expert, but a more learner centered classroom can evolve. Critical to this is that active learning techniques are used in the classroom. Peer to peer interaction, team activities and other high engagement and motivational approaches form the basis of much of the learners’ negotiation of meaning.

There are caveats to this research. The most commonly cited concern was generalizability of the results. Other concerns include the difficulty in representing a complex learning environment and accounting for all the variables that may be in play (Huang & Lin, 2017). These concerns are not unique to studying the flipped classroom but rather are raised on a regular basis in educational research. In addition, not all of the studies cited here are in business education. There may be some considerations that business educators need to take into account, for instance the importance of case studies, that STEM educators and others may not need to.

All of the studies found some efficacy to using the flipped classroom. The depth of research, over a 20 year period, and the evolution of the practice of the flipped classroom over that time, indicates that the concept of the flipped classroom is here to stay - it is not just another educational fad. More research work needs to be done, in as many different learning environments as possible – residential, hybrid and online; in different content areas (Is business statistics different enough from entrepreneurship that differing approaches should be taken?). Key to the future of this research and its role in supporting the development of Business education in the 21st century, is tying the practice of the flipped classroom to established business education research and the principles of how we learn in the digital age.

## PROS

Learners share responsibility for learning with professors. Learners are more engaged with the content. This self-efficacy positively impacts students’ internal motivation, learning achievement and satisfaction. (Huang & Lin, 2017; Lundin, M., et.al. 2018).

Class time becomes more meaningful. Classes can be devoted to learner centered, active learning activities which decades of research has found to measurably further deeper learning. (Akçayır & Akçayır, 2018; DeLozier, 2017; Lundin, M. 2018; Perez, et. al. 2019, Shinaberger, 2017).

Active learning can comprise a wide range of effective learner-centered instructional strategies that may be tailored for individual courses, as appropriate (Perez, et.al. 2019, Lundin, M. 2018, Akçayır & Akçayır, 2018). These include, but are not limited to,

* higher-level questions and discussions
* experiments,
* problem solving and problem-based activities
* analysis of research hypotheses,
* deeper exploration of the content,
* collaboration and interaction with other students
* feedback to students from professors and other students.

Guided practice: With a solid background from at-home lectures, students can practice skills in class with expert guidance from teachers and peers. By observing students applying new knowledge during class, faculty can better identify student problems and knowledge gaps.

The use of visual media such as videos, podcasts, and vodcasts is a viable pedagogical option to access instructional content as it supports a self-directed, learner-centered approach to learning. (Frankl, 2014; Rivero, 2013)

Advantages in using visual media to deliver instructional content in a flipped classroom include (Frankl, 2014):

* access to media material on demand;
* pausing and replaying videos,
* interactive videos,
* access of content via mobile devices,
* quick dissemination, consistency, and updates of content,
* distribution to a wide audience, and
* accommodation of varied learning styles/preferences.

The flipped classroom is transformative. It is not just integrating new technologies; it is shifting a paradigm to take advantage of them. (Rivero, 2013)

Implementing a flipped classroom style of teaching in a business statistics class resulted in a significant increase in student performance on exams. (Shinaberger, 2017).

## CONS

Instructor Adjustment – it can be time consuming. It requires thinking differently about the content. It requires creating activities that an instructor may not have used before. (Rivero, 2013)

Due to the vast differences in how instructors flip their classrooms, there is no single template that may be easily applied (DeLozier, 2017)

Student Adjustment – students need to be taught how to learn in this structure. They need to take more responsibility for their learning. (Akçayır & Akçayır, 2018; Lundin, et.al., 2018; Rivero, 2013)

Some studies indicate that students are better prepared for class, while others indicate limited student preparation for class. (Akçayır & Akçayır, 2018)

Presenting extremely complex problems in a flipped classroom format can be counterproductive. (Perez, et.al.)

Because of the inherent complexity of the learning environment, generalizability of some of the studies is limited. Individual variables such as learning styles and personality may have an effect. (Huang & Lin, 2017)

More work needs to be done to examine the impact of individual components of the flipped classroom. (DeLozier, 2017)

## Annotated Bibliography

\*indicates business education focus

### Flipped Classroom Research

1. \*Pérez, A., Collado, J., Delmar Garcia de Los Salmones, M., Herror, A., & San Martín,H. (2019, March).An Empirical exploration of the perceived effectiveness of a ‘Flipped Classroom’ in a business communication course. *Journal of the Scholarship of Teaching and Learning, Vol. 19,* No. 2, pp.47-65. <https://uosc.primo.exlibrisgroup.com/discovery/fulldisplay?docid=eric_sEJ1213974&context=PC&vid=01USC_INST:01USC>

*These authors examined the impact of engagement, task orientation and complexity of task on perceived effectiveness and satisfaction of the learning activity in a flipped classroom. They found the flipped classroom is effective for achieving learning outcomes and boosting learner motivation. Engagement boosts motivation which contributes to the ability to complete tasks. While a certain degree of complexity is desirable, complexity should be carefully structured and considered as the amount of time it may take students to negotiate learning could be counterproductive.*

1. Lundin, M., Rensfeldt, A., Hillman, T., Lantz-Andersson, A. & Peterson, L. (2018). Higher education dominance and siloed knowledge: a systematic review of flipped classroom research*. International Journal of Educational Technology in Higher Education 15*:20.

<https://doi.org/10.1186/s41239-018-0101-6>

*This study of 530 studies on the flipped classroom format that were published through June 2016 finds the research to be siloed/fragmented, often more anecdotal. Recommendations that the flipped classroom research be more anchored in learning theory or current instructional design that incorporate educational technology. There is also a confluence of the format of instructional delivery and various active learning theories (constructivism, behaviorism, etc.), making it challenging to isolate the effects of each from an empirical research perspective.*

1. Låg, T., & Sæle, R. G. (2019). Does the Flipped Classroom Improve Student Learning and Satisfaction? A Systematic Review and Meta-Analysis. AERA Open. <https://doi.org/10.1177/2332858419870489>

*This recent meta-analysis of 272 articles notes the gaps in research. It concludes that flipping the classroom will have at least a small positive impact on student learning.*

1. Akçayır, G., & Akçayır, M. (2018). The flipped classroom: A review of its advantages and challenges. *Computers & Education. 126*:334-345. <https://uosc.primo.exlibrisgroup.com/permalink/01USC_INST/273cgt/elsevier_sdoi_10_1016_j_compedu_2018_07_021>

*The most frequently reported advantage of the flipped classroom is the improvement of student learning performance. Also discusses challenges to the flipped-classroom model, including student preparation for class.*

1. \*Huang, C. K., & Lin, C. Y. (2017). Flipping Business Education: Transformative Use of Team-Based Learning in Human Resource Management Classrooms. *Educational Technology & Society, 20* (1), 323–336. www.jstor.org/stable/jeductechsoci.20.1.323

*The results show the positive relationships among the students’ perceived team members’ valuable contributions, motivation, enjoyment, and learning outcomes.*

1. \*Shinaberger, L. (2017). Components of a Flipped Classroom Influencing Student Success in an Undergraduate Business Statistics Course, Journal of Statistics Education, 25:3, 122-130. <https://doi.org/10.1080/10691898.2017.1381056>

*The results provide guidance to successfully implement a flipped classroom course. The largest improvements were achieved by replacing face-to-face lecture with active learning exercises and using quizzes to verify student engagement with offline materials. Using conditional release of course materials to encourage homework completion also provided a significant benefit to students who missed class often.*

1. DeLozier, S. & Rhodes, M. (2017). Flipped Classrooms: a review of key ideas and recommendations for practice. *Educational Psychology Review 29*:141-151 https://uosc.primo.exlibrisgroup.com/permalink/01USC\_INST/273cgt/springer\_jour10.1007%252Fs10648-015-9356-9

*Many flipped classroom activities, such as audience response, open questions, quizzes, the use of clickers, pair-share activities, problem solving, group discussions, team based activities and student presentations – in sum, active learning opportunities – were found to be beneficial to the learner. However, more work needs to be done to examine the individual components of a flipped classroom.*

1. \*Guy, R., & Marquis, G. (2016). The flipped classroom: A comparison of student performance using instructional videos and podcasts versus the lecture-based model of instruction. *Issues in Informing Science and Information Technology, 13,* 1-13. https://link.gale.com/apps/doc/A498675905/PROF?u=usocal\_main&sid=PROF&xid=da8f293f

*This study, based in Business education, concludes that the instructional interventions that were implemented because the flipped classroom was used, resulted in students in the flipped sections outperforming the students in the traditional instructional delivery classes.*

1. Francl, T. (2014, March). Is Flipped Learning Appropriate?, *Journal of Research in Innovative Teaching. Vol. 7*, Issue 1, 119 - 129. https://assets.nu.edu/assets/resources/pageResources/journal-of-research-in-innovative-teaching-volume-7.pdf
2. \*Rivero, V. (2013, January 1). Tools for learning: Flipping out—a new model to reach all students all ways. *Internet@Schools Magazine*. http://www.internetatschools.com/Articles/Editorial/Features/TOOLS-FOR-LEARNING-Flipping-Out--A-New-Model-to-Reach-All-Students-All-Ways-86947.aspx

*Rivero itemizes why he believes that flipped classrooms are hee to stay from both an experiential and a pedagogical perspective. He then examines the use of the approach in 2 MBA courses at National University and discusses both the adjustments needed by the professor and the adjustments needed by the students. He also discusses the use of rubrics in the flipped classroom and it’s efficacy as one of the pedagogical approaches.*

### Active Learning Research

1. Deslauriers, L., McCarty, L., Miller, K., Callaghan, K., and Kestin, G. (2019, September 24). Measuring actual learning versus feeling of learning in response to being actively engaged in the classroom. *PNAS* *116*(39) 19251-19257. <https://doi.org/10.1073/pnas.1821936116> (The lengthy informative appendix is also available to download.)

*This study finds that the active classroom improves learning, but students perceive this format to be less effective and satisfactory without explicit initial and recurrent instructor explanation of the research-based benefits to student learning.*

1. \*Narendran, R., Almeida, S., & Coombes, R. (2018). The Role of Self-Determination Theory in Developing Curriculum for Flipped Classroom Learning: A Case Study of First-Year Business Undergraduate Course. *Journal of University Teaching and Learning Practice. 15*(5):1-22. <http://search.proquest.com/docview/2228635633/>

*This study by nine business faculty teaching first year business students sought to measure the effect of the flipped class format on student self-determinization and motivation. Despite the title, the focus was on the active learning strategies, collaborative, socially constructed peer learning approach, scaffolded assessments and ongoing specific feedback on assessments, rather than on the flipped classroom format. These were effective, but might also be a component of traditional classroom.*

1. Freeman, S., Eddy, S., McDonough, M., Smith, M., Okoroafor, N., Jordt, H., & Wenderoth, M. (2014). Active learning increases student performance in science, engineering, and mathematics. *Proceedings of the National Academy of Sciences of the United States, 111*(23), 8410–8845. https://www.pnas.org/content/111/23/8410

*Meta-analysis. The studies analyzed here document that active learning leads to increases in examination performance that would raise average grades by a half a letter, and that failure rates under traditional lecturing increase by 55% over the rates observed under active learning.*

1. Vygotsky, L. (1978). Mind in Society: The development of higher psychological processes. Cambridge MA: Harvard University Press.

*This is one of Vygotsky’s seminal writings on how people learn. Although it does not reference the flipped classroom, it is a core perspective from one of the acknowledged educational psychology experts.*

### Additional Articles

1. Hew, K., & Lo, C. (2018). Flipped classroom improves student learning in health professions education: a meta-analysis.(Report). *BMC Medical Education. 18*(1):1-12. https://doi.org/10.1186/s12909-018-1144-z

*A meta-analysis showed an overall significant effect in favor of flipped classrooms over traditional classrooms for health professions education. The flipped classroom approach was more effective when instructors used quizzes at the start of each in-class session.*

1. Prepose L.S. (2014). Online, flipped, and traditional instruction: a comparison of student performance in higher education. <https://uosc.primo.exlibrisgroup.com/permalink/01USC_INST/273cgt/datacite16137466>

*This dissertation’s small sample size study found that final exam scores were higher for flipped classrooms than traditional classrooms-but so were online classrooms. Also, student satisfaction was highest with flipped classrooms, followed by traditional classrooms, with online classrooms lagging.*

1. Bergmann, J., & Sams, A. (2012). Flip your classroom: Reach every student in every class every day. Eugene, OR: International Society for Technology in Education.

*Book: Students watched recorded lectures for homework and completed their assignments, labs, and tests in class with their teacher available. Bergmann and Sams found that their students demonstrated a deeper understanding of the material than ever before.*

1. Deslauriers, L., Schelew, E., & Wieman, C. (2011). Improved learning in a large-enrollment physics class.*Science, 332*(6031), 862–864.<https://science.sciencemag.org/content/332/6031/862.long>

*Demonstrates increased student attendance, higher engagement, and more than twice the learning in Physics section taught using research-based instruction by an inexperienced instructor, compared to traditional lecture by an experienced instructor. The instructional approach used in the experimental section included pre-class reading assignments and pre-class reading quizzes (flipped class), in-class clicker questions with student-student discussion, small-group active-learning tasks, and targeted in-class instructor feedback.*

1. Prince, M. (2004). Does Active Learning Work? A Review of the Research. *Journal of Engineering Education, 93*(3), 223–231**.** https://www.engr.ncsu.edu/wp-content/uploads/drive/1smSpn4AiHSh8z7a0MHDBwhb\_JhcoLQmI/2004-Prince\_AL.pdf

*Reviews literature support for groupwork/collaboration, problem-based learning, and active learning (in contrast to lecture).*

1. Hake, R. (1998). Interactive-engagement versus traditional methods: A six-thousand-student survey of mechanics test data for introductory physics courses. *American Journal of Physics, 66*(1), 64–74. [https://doi.org/10.1119/1.18809](https://urldefense.com/v3/__https:/doi.org/10.1119/1.18809__;!!LIr3w8kk_Xxm!611-IHbff1YfD6OqdeetLqIGhO81QIGCoVA0oze5KvUrbCp8y7FWoWtNaPEoOHhjOHWV4A$)

*Statistically analyzes student pre- and post- course data to prove that student engagement and interaction methods are approximately 2x as effective as traditional lecture.*

### Additional Resources

ISTE (<https://www.iste.org/explore/topic/flipped-learning>)

The Economist (<https://www.economist.com/science-and-technology/2011/05/12/an-alternative-vote>)

(<https://21centuryedtech.wordpress.com/2012/07/18/flipping-the-classroom-a-goldmine-of-research-and-resources-to-keep-you-on-your-feet/>)

*Articles, both pro and con are in here, and good analysis:*

Blog: <http://teachingwithoutpants.blogspot.com/search?q=flipped+class>

*Its key takeaway was that faculty must orient students to every component of the course and provide a “value proposition” for why the course is structured as it is.*

Website: <https://www.cmu.edu/teaching/technology/flippingtheclass/index.html>

*Has a great section of practical advice from early adopters.*