MOVING BEYOND HOMEWORK

The Role of Asynchronous Education in Learning

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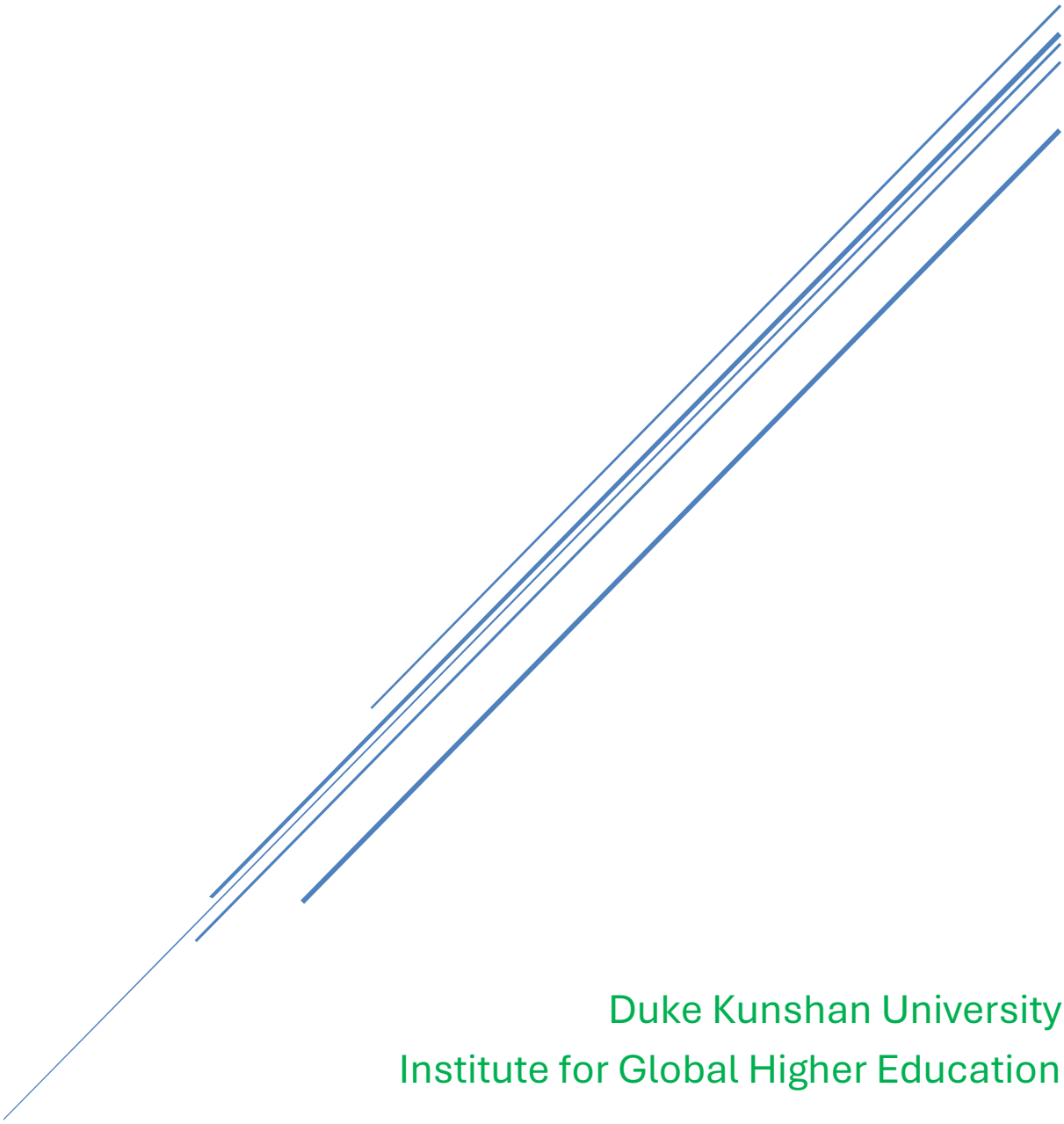

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Executive Summary

Structured asynchronous learning, defined as purposeful, out-of-class activities, demonstrates significant potential for enhancing student achievement, engagement, and satisfaction, particularly when contrasted with traditional homework assignments. While meta-analyses on blended learning show mixed results on overall achievement, they consistently support that positive outcomes are highly dependent on the quality of pedagogical design.

From the research, effective practices include structuring activities to engage the full Kolb learning cycle, incorporating high-quality multimedia, promoting metacognition, and ensuring timely, actionable feedback.

Successful adoption is constrained primarily by administrative and faculty-side challenges, chiefly the perception of increased instructor workload and the requisite need for professional development, alongside managing heterogeneous student comfort with technology. The evidence concludes that intentional design of out-of-class time is a critical mechanism for improving educational outcomes.

Summary of Best Practices	
Metacognition	Thoughtful inclusion of self-reflection opportunities is key
Social Interaction	Opportunities for students to seek faculty and classmate interaction to overcome key moments of learning difficulty
Multimedia	Small, chunked videos and content allow for self-paced learning
Implementation	Important to provide training and resources to faculty and students

Introduction

Recent studies indicating that students now spend only 14 hours or less per week on homework have sparked debate in the popular press about the rigor of university education and whether modern students are becoming lazy (Babcock and Marks 2010; Hess and Fournier 2025). A recent *New York Magazine* headline even asked whether students are simply "…cheating their way through college" (Walsh 2025). These discussions often assume that time spent on traditional homework outside of class is the most effective way to promote student mastery, is inherently engaging, and aligns with modern expectations for technology use. All of these assumptions are highly questionable.

At the same time, the pandemic transformed the educational model. What was once a system in which most learning occurred in the classroom—leaving out-of-class time for reviewing material and completing traditional homework—shifted to one where instructors often did not deliver live lectures, and most or all content was provided asynchronously. While many universities have since reverted to pre-pandemic instructional modalities, the opportunities the pandemic revealed—to be more intentional about how out-of-class time is used—remain just as important today as they were in 2020.

This report investigates whether better use of students' asynchronous time outside of class—structured intentionally to align with in-class learning rather than as an afterthought—can lead to meaningful learning gains, as well as increased student satisfaction and engagement. It also reviews the literature to assess what adoption challenges, if any, would need to be addressed to implement this alternative curricular model. The key questions of this report are summarized as follows.

Key Questions

1. Is structured asynchronous learning more effective than traditional approaches?
2. Does structured asynchronous learning affect student engagement and satisfaction?
3. What are the best practices for asynchronous learning?
4. What are the implementation hurdles for asynchronous learning?

The short answer to these questions is that, as expected, adopting a well-designed asynchronous curriculum can lead to significant gains in student performance and engagement. Such a curriculum includes activities that require students not only to encounter new material but also to apply it and reflect on both the content and their own learning process. However, designing and implementing this type of curriculum presents challenges—particularly in terms of faculty time and effort—which must be carefully addressed.

This report first considers the existing literature on how asynchronous learning affects student learning outcomes, including areas such as content mastery and student motivation. This section also draws on meta-analyses on the subject from the related blended learning literature. The following section discusses more concrete mechanisms that link the observed outcomes and potential interventions. The third section discusses actionable recommendations and the final section shares some concluding thoughts and areas for future research.

Methodology and Definition of Terms

Methodology

The literature identified in this report was gathered using two primary methods: a traditional keyword search with Google Scholar and assistance from a new AI research tool called Elicit. The traditional keyword search began with "**asynchronous learning in higher education**" prioritizing relevant articles from the past ten years. A similar search for "**blended learning in higher education**" was also conducted to find additional articles of interest. Elicit, an AI research tool, was used to locate and summarize large bodies of literature. This tool primarily served to cross-reference and include any articles not identified by traditional methods and to summarize literature that was not directly the main focus of this report.

Definition of Terms

Specifically, this report aims to examine the efficacy of different strategies for organizing and using time outside of class. This report refers to these non-classtime, non-instructor lead times as **asynchronous learning**, in that the instructor provides activities and guidelines for students about how best to utilize this time and then the students are given freedom to work on their own schedule and pace on the material.

However, in the literature, the term asynchronous learning can take on other meanings. In some research contexts, asynchronous learning is synonymous with wholly or partially online coursework (Hiltz and Wellman 1997). The reason for studying these contexts is often to see if this type of education can provide outcomes similar to traditional face to face classrooms when such options are not available for exigency reasons (such as COVID-19) or for cost reasons (such as MOOCs). In most research settings, the format is usually that students will join an online lecture and then complete some activities in online forums or do a significant amount of work on their own time. There are some research questions and settings that have relevance for the purpose of this report, but it is important to note that many of the studies have different aims than this report. Additionally, the different context of completely online education limits the transferability of results.

Another similar term to asynchronous learning is **blended learning**. The simplest definition of blended learning is mixing some form of traditional teaching with online learning often with the implication that traditional classroom hours are in some part replaced by online learning. However, research on the topic has reached a wide variety of conclusions, in part because blended learning can range from introducing minor online components to educational programs in which most of the student learning is organized through educational technologies. However, blended learning research does have significant applications for better understanding how to use time outside of the traditional classroom, as many of the opportunities to better use student efforts involve use of technology tools, particularly those that are interactive (such as AI, simulations, etc.).

Overall Effect on Student Learning

The literature on asynchronous learning, as defined as structured educational activities outside of the classroom within a traditional classroom setting, is relatively sparse empirically. There are some studies from the pandemic period, though they are of limited applicability, and a few other studies that are only beginning to explore key questions.

By far the largest number of empirical studies were conducted during COVID-19. The results vary significantly, from improved student achievement to findings of learning loss. One advantage is reduced selection bias; however, generalizability is limited.

The conclusions from these studies vary widely:

- Some studies show improved outcomes
- Others show no difference
- Others show negative outcomes

While the study quality of the COVID-era research is mixed, the research does support the idea that student characteristics appear to matter. Some learners benefit more from asynchronous formats than others.

Evidence from blended learning provides additional insight. Meta-analyses of blended learning research suggest:

- Small positive effects OR no significant difference for asynchronous activities
- Improvements in engagement and satisfaction
- Context-specific variation (e.g., weaker effects in U.S. contexts)

Overall:

- Effects are mixed but generally non-negative
- Outcomes are highly dependent on design quality
- Heterogeneity across students is substantial

Student Learning Outcomes

Student Content Mastery

By far the largest number of empirical studies of asynchronous learning were conducted during the COVID-19 remote learning environment (Schreiber 2022; Shlomo and Rosenberg-Kima 2025; Vaca-Cárdenas et al. 2024; Wu and You 2022). The results of these investigations vary significantly, from finding that asynchronous learning leads to greater student achievement (Demirtaş and Türk 2022) compared to synchronous learning to several studies that find the opposite (Fabriz, Mendzheritskaya, and Stehle 2021; Fernandez, Ramesh, and Manivannan 2022). One advantage of

research developed during the pandemic is that the selection bias present in much of the literature is lessened - rather than highly motivated teachers and students engaging in new experiments, in many countries all classes and students were required to participate in some form of asynchronous education. On the other hand, the experience of the pandemic has obvious issues with generalizability.

Most of this research is focused on key question 1: is structured asynchronous learning more effective than traditional approaches? However, the almost exclusive focus in the literature on pandemic-era experiences and the wide variety of approaches taken by instructors during the online only educational period make it difficult to draw firm conclusions.

The conclusions of this research vary widely, from finding significant learning loss due to asynchronous education to other investigations that found no learning loss or even some benefits to asynchronous education. Ravizza et al. (2023) made the important point that specific student personalities may be better suited to asynchronous learning compared to others in terms of outcomes.

As highlighted in the meta analysis by Varkey et al. (2022), there is a significant amount of high-level conceptual agreement as to best practices in asynchronous education for student outcomes, based on research in other areas of education. However, there are relatively fewer studies outside of the pandemic that test these best practices in real classroom settings, and almost none that consider finer-grained questions about specific intervention modalities. This research gap leaves wide space for further research.

Open Questions

- Does a best practices design for asynchronous activities improve student comprehension of the material?
- How does varying the best practices (i.e. changing the nature of the exit tickets or the types of media offered to the students) affect student outcomes?
- Given instructor time constraints, what are the highest value interventions that instructors can easily utilize?

Student Engagement and Motivation

Relevant to key question 2 of the report, there are a few studies that find that student engagement is enhanced by structured asynchronous activities. Ang et al. (2024) devised an experiment that tested a Community of Inquiry (CoI) approach to asynchronous education, in which the activities were all designed to have a social, cognitive, and teaching presence. Using a mixed methods approach, the researchers found that student interest and motivation was significantly improved by use of the CoI framework. In particular, the students appreciated the “chunked” approach to learning, in which there was more time for meta cognition and opportunities for self-regulation of learning.

Radovan et al. (2024) similarly find that students feel less stressed and more engaged with the material in asynchronous learning environments, though, contra Ang et al., the students reported lower motivation. Yang and Romero-Hall (2024) conducted a pilot study and found that asynchronous content that encouraged both learner-content (interactive content) and learner-learner interactions had significantly positive effects on motivation while other types of asynchronous content did not.

However promising these studies are, they are also small in scope and address very particular implementations of asynchronous learning.

Open Questions

- Are there different kinds of students for whom structured asynchronous activities are effective and others for which it is not?
- Does this type of learning style produce long lasting increased interest or are the positive results primarily due to a novelty effect?
- Are there different types of courses and activity structures that are more likely to generate engagement?
- If asynchronous learning modules decrease motivation, are there any solutions or complements that can help address the problem?
- How will AI influence a student's ability to self-regulate the asynchronous learning process?

Meta Analyses

The meta-analyses on the subject (primarily on blended learning) helps provide some possible answers for key questions 1-4 that were not addressed by the literature specifically on asynchronous learning. As discussed in the introduction, blended learning is closely related to structured asynchronous learning. It involves students replacing some traditional class time with online education, often delivered through asynchronous methods such as recorded lectures or multimedia. The main difference is that blended learning often aims to partially replace in-person classroom time with online activities for reasons of cost or educational accessibility.

However, both research areas focus on how to best structure student time that is not spent in face-to-face interaction with instructors and peers. Since blended learning has garnered significantly more research interest, the findings from this research, when considered in light of the four key questions outlined in the introduction, can effectively address empirical gaps in the literature on asynchronous education.

Blended Learning Meta Analyses of Student Achievement and Motivation

Three recent and comprehensive blended meta-analyses—each using different but complementary inclusion criteria—suggest that blended learning offers advantages over traditional educational

approaches. Many best practices identified for asynchronous education are also supported in the blended learning literature.

There are a large number of meta analyses of many different sub-aspects of blended learning – for example, a recent review of the literature on 3D holograms for use in teaching by Yu et al. (2024). There is even at least one meta analysis of the complete set of blended learning meta analyses by Ashraf et al. (2021). To help narrow down the study area, Elicit's AI tool was used to help suggest meta analyses post-COVID that focused primarily on higher education. Additional Google Scholar searches were then also used to locate suitable candidates. This strategy yielded the following three meta-analyses that focus, to varying degrees, on student achievement, student engagement, and best practices, key questions 1-3 of this report.

Meta-analysis focused on student achievement

The first meta-analysis by Müller and Mildenberger (2021) on blended learning focuses specifically on whether blended learning helps improve student achievement. The study authors set a strict inclusion condition in which the blended learning study must be between 30-70% online, so no studies of minor adoptions of technological tools nor fully online educational studies are considered. The authors review the effect sizes and find that while the combined effect size is positive, it is within the margin of error. The authors additionally consider possible moderator variables, such as method of instruction or class type and also find no significant positive relationship.

The study authors had mixed feelings about the findings, suggesting that while blended learning is not an educational panacea, if there are cost or other savings associated with blended learning, selecting it as a mode of instruction may be reasonable and not necessarily harm student achievement.

→ Takeaways:

Key question 1: Is structured asynchronous learning more effective than traditional approaches?

If blended learning is a stand-in for asynchronous learning, then no, though also no evidence that it is worse than other approaches

Key question 4: What are the implementation hurdles for asynchronous learning?

The study was partially interested in whether blended learning, when implemented as a cost saving measure, imposed any learning penalties on students. In that context, if use of asynchronous learning reduces the long-run cost of education or frees up resources to be redeployed elsewhere, this study suggests that at the least students are not worse off

Broad scope meta analysis

The second recently published meta-analysis is by Wenwen Cao (2023). The author casts a wide net for studies that use at least two teaching modalities (such as both online-offline) and finds generally positive results for blended learning. Cao surveys the impact of blended learning on four different dimensions:

1. Performance - the measurable output of student's achievement
2. Attitude - student's attitude toward the instructional modality
3. Achievement - a broader measure of student mastery that aims to assess skills gained by blended learning
4. Engagement - how involved and invested students are in the learning process

The meta-analysis includes studies from many different cultural contexts and finds that, across many different learning cultures, blended learning does generally have a small but positive increase of all four dimensions considered. However, when focusing on specific countries, it finds that in China and the US, engagement was not different between blended and traditional classrooms. Additionally, in studies located in the US, there was no measurable increase in student performance.

The meta-analysis took a broad definition of blended learning and therefore it is perhaps not surprising that the effect sizes are small given the differences in what each study might classify as blended learning. Additionally, the meta-analysis did not carefully consider what the appropriate baseline measurement should be - it left it up to each study to define.

→ Takeaways:

Key question 1: Is structured asynchronous learning more effective than traditional approaches?

In other cultural contexts, yes, though no evidence of it in the US.

Key question 2: Does structured asynchronous learning affect student engagement and satisfaction?

According to this meta analysis, evidence from blended learning suggests that it does positively affect student satisfaction

Meta-analysis focused on moderators of blended education

A third, more structured, meta analysis by Yu et al. (2025) also finds significant benefits in blended learning for learner achievement. The study authors define blended learning as any combination of online and face-to-face learning (so a more expansive definition than Müller and Mildenberger) on any level of education, though most of the studies are of higher educational settings. The study authors reported on a number of important moderator variables and how they influenced learner achievement:

- Class size was not significant
- Duration of intervention was not significant
- No differences found between STEM and non-STEM classes
- Group plus individual focused activities in combination had the highest impact
- Synchronous and asynchronous interactions combined improved engagement
- Using a balanced proportion of online learning (30-69%) produced the best results
- Using a case-based or task-based method of inquiry had greater potential

The limitations of this meta analysis is that it focused primarily on learner achievement and again the baseline issue is also not carefully considered. Additionally, while not a limitation of the analysis per se, many of the moderators that increased the success of blended learning are general recommendations to improve educational quality.

These recommendations are largely echoed by a follow-up study to the first meta analysis. Müller et al. (2023) found that course design was an essential element in student success in blended learning, including such features as:

- Well structured course design
- Good use of appropriate learning videos
- Activation activities to apply the learned material to new situations
- Social presence of the instructor to offer prompt feedback
- Clear feedback on assignments that is offered quickly (or even automatically) after submission

The main difference that the authors found in contrast to Yu et al. was that group work was seen as having advantages and disadvantages, as some studies found it hard for students to be able to organize groups in a blended setting.

→ Takeaways:

Key question 1: Is structured asynchronous learning more effective than traditional approaches?

Again, if blended learning can be analogized to asynchronous learning, then unambiguously, yes

Key question 3: What are the best practices for asynchronous learning?

As identified in the list in the previous paragraphs, there are many recommendations

<u>In summary:</u>

Meta-analyses of blended learning, which is analogous to structured asynchronous education, suggest mixed but generally non-negative effects on student achievement, with outcomes being highly dependent on intentional course design and specific pedagogical practices. While one meta-analysis found the overall positive effect on student achievement to be within the margin of error, others indicated a small yet measurable increase in student performance, attitude, achievement, and engagement across different learning cultures, although these positive effects were notably absent in US-based studies of performance.

Critical factors consistently associated with improved learner achievement include using a balanced proportion of online content (30-69%), integrating both group and individual activities, employing case- or task-based inquiry, and ensuring high-quality design elements such as well-structured courses, activation activities, and prompt, clear instructor feedback.

<u>Open Questions:</u>

- What actually drives learning gains in asynchronous/blended learning—modality or design?
- How sensitive are outcomes to variation in how "blended learning" is defined and implemented?
- How should researchers define and standardize baseline comparisons when evaluating blended or asynchronous learning?

Mechanisms: How and Why Asynchronous Education Works

This section examines the mechanisms through which structured asynchronous learning may influence student outcomes. Because direct empirical evidence is limited, much of this discussion draws on broader educational theory and identifies the psychological and pedagogical processes—such as spacing, metacognition, feedback, and social interaction—that underpin effective asynchronous learning environments.

Varkey et al. Proposed Mechanisms

As introduced in the previous section, Varkey et al. provide a list of potential mechanisms around which asynchronous learning should be structured. Their list of proposed mechanisms includes the following:

1. Spacing and Interleaving

   One of the key advantages of asynchronous study is the ability to utilize the learning process of interleaving material. As the authors point out, a number of studies have suggested that when material is refreshed throughout the week rather than right before class, student retention of the material is enhanced (Murphy, Bjork, and Bjork 2023).

   In particular, the authors recommend **desirable difficulties and productive failures** (Wagner, Schindler, and Reinhard 2017) for implementing spacing and interleaving. Desirable difficulties means introducing productive difficulties that challenge learners in their recall and interpretation of material, ultimately leading to greater mastery of the material. The challenges should be meaningful but manageable, and, particularly with spacing and interleaving, low stakes, such that students do not feel discouraged by failures.

   Some common ways to implement spacing and interleaving include:

   a. *Discussion forums*

Discussion forums are a common modality for instructors using online learning platforms, and research has found that simple instructions such as make one post and respond to two other posts online substantially engages student learners in spacing and interleaving-type learning (Hattie and Timperley 2007).

Possible downsides: In the age of generative AI, it is hard to know how effective such assignments will be. Additionally, there may be a novelty effect of such assignments - students may eventually view such forum posts as rote work.

b. Spaced question sets

Spaced question sets are when questions regarding assigned reading and material are scheduled for due dates that do not coincide with class days, strongly encouraging students to engage with the material on the days in which class is not meeting. The questions can be simple multiple choice or more complex questions, but either way the students, through use of these tests, are encouraged to work on the material on non class days. Many online learning platforms and e-textbook software have options to provide quick quizzes to check student comprehension and the due dates can be adjusted so that students are required to submit their responses on non-class days.

Possible downsides: Beyond the problem of AI, there is not yet a well-tested temporal spacing recommendation for these kinds of tests. Additionally, much of the research in this area lacks strong external validity (Bjork and Bjork 2020).

c. More generally: formative assessments

The previous two types of asynchronous activities can be generalized as types of **formative assessments**, that is, low stakes assignments that seek to correct misunderstandings and focus the learning process rather than assignments that aim to definitively judge student mastery. There are a number of other types of formative assessments that can be used asynchronously, such as submitting rough drafts and, after receiving feedback, revising appropriately.

Formative assessments can be especially helpful in an asynchronous environment, in which students lack the ability to instantly receive instructor feedback on ideas - they alert students when they have gaps in understanding and can help focus study on problem areas of understanding without instructor intervention.

Possible downsides: Not a downside of formative assessments, per se, but rather, inappropriately timed formative assessments have been shown to frustrate learners more than help them

2. Metacognition

Scholars have extensively documented the important role of metacognition in the learning process (Tanner 2012; Veenman, Van Hout-Wolters, and Afflerbach 2006), in particular in helping students self-regulate their learning process. The authors of the meta analysis find that this process is even more essential in asynchronous learning, where there are fewer opportunities to receive external feedback.

a. Exit tickets

One strongly recommended technique is to employ exit tickets at strategic moments in the learning process. Traditionally, exit tickets are employed at the end of a class – students are asked to reflect on what they learned during the class by writing a few sentences on a note card that summarize their main takeaways from the class and then handing in the note card (their permission to exit).

This same principle can be applied to asynchronous activities. The authors surveyed different responses and found it effective to ask students to fill out exit tickets at the end of recorded lectures or key videos. In this way, the metacognition is located directly adjacent to the learning and fits Kolb's experiential learning cycle (Kolb and Kolb 2009).

3. Feedback

While there is relatively little research on specific methods of feedback, the meta-analysis authors recommend that feedback have the following characteristics:

1. Immediacy - the feedback happens as close to the activity being evaluated as possible
2. Actionable - the feedback that is provided can be immediately used to update the learning process
3. Clear and concise - the meaning of the feedback is clear and its meaning is easily grasped
4. Provides student agency - the feedback should not proscribe a specific set of steps but rather provide the student more opportunities to experiment with the material.

However, feedback in asynchronous contexts, such as when to provide the feedback for maximum effectiveness, and how best to utilize scarce instructor time, are areas that need additional research.

4. Learning Design and the Kolb Cycle

As in the previous sections, a well-designed asynchronous set of activities should ideally follow the Kolb learning cycle as follows:

1. Begin with a tangible experience (watch a well-designed video or finish a unit of reading)

2. Reflective observation on the material - such as an **exit ticket**
3. A higher-order, more involved abstract conceptualization of material
4. Active experimentation of the material, through role-play, dialog with other students, and feedback from the instructor

Cautionary note: While the authors have some evidence for the effectiveness of exit tickets in asynchronous learning, how to apply the full Kolb learning cycle to asynchronous education has not been sufficiently studied.

While these recommendations are helpful, they are not deeply informed by empirical work and leave a number of open questions and areas of research. Overall, the existing literature provides little in the way of guidance in answering key questions 1, 2, and 4. This gap leaves significant room for future research (as identified in the next section).

Social and Cognitive Engagement Mechanisms

Beyond Varkey et. al's work, there have been a small number of additional studies that narrow the focus to specific ways in which various types of asynchronous learning practices may be effective. These studies also provide insight into key question number 4.

The most recent meta analysis of how to employ blended learning by Anthony et al. (2022) highlights a number of key administrative factors for students, instructors, and administrators that determine whether the effort will be successful. The authors identify many important factors in the adoption of blended learning for each of students, instructors and administrators, the following paragraphs highlight the factors listed that pertain most to the adoption of structured asynchronous education.

On the student side, they identify **lecturer responsiveness**, **communication** with other students, and **availability to access** the technological tools as key. Lecturer responsiveness, or the ability to receive feedback, is also likely to be important in structured asynchronous learning, as is the ability to effectively communicate with classmates. For asynchronous learning, if the class is situated on a traditional campus, availability to access may be less important as quality internet access is usually available to students. However, issues such as VPNs or students who commute to campus may hinder successful implementation of the model for students.

The factors important for lecturers, according to the study, include the instructor's **attitude** toward blended learning, **acceptance** of blended learning, **clarity** of blended learning goals, and **flexibility** of the blended learning curriculum and technology. The first two factors are related to the second two factors - the acceptance and attitude can be negatively impacted by poor clarity and flexibility. Since structured asynchronous learning does not necessarily require intensive technological use and the structure is not necessarily as proscribed as in blended learning, the flexibility may be higher. On the other hand, given the many different possible implementations of asynchronous learning, the clarity may be lower. As in blended learning, significant buy-in and training are likely to be required.

For administrators, the authors identify the following factors as important: **advocacy** of blended learning, **resource support, tenure and promotion credit**, and availability of **professional development**. Advocacy of the importance of blended learning and its value is an important step in aligning the attitudes of faculty toward the project and gaining their acceptance. Resource support, by way of provision of technological and other tools, is important in allowing student access, but also improving all four of the factors mentioned for faculty support. Tenure and promotion credit for successful implementation of blended learning can help with instructor acceptance of blended learning. Finally, providing opportunities for faculty to train and continue to adopt best practices further helps provide flexibility and acceptance among instructors. All of these factors seem highly relevant for successful implementation of asynchronous education.

Several recent case studies (Anthony Jnr. 2022; Hill and Smith 2023; Le, Allen, and Johnson 2022) of the adoption of blended learning reinforce the general conclusions of Anthony et al. and add some useful context. Perhaps the most significant factor discussed that was not mentioned in the meta analysis is the issue of instructor workload. All three studies noted that a key barrier to faculty adoption of blended learning was the perception that blended learning would require significantly more faculty time. Some of the studies noted that faculty with the lowest technological skills also had the greatest anxiety about adopting blended learning, in part due to the perceived workload problem. Another consideration raised in the summaries was that student response to blended learning was heterogeneous, some students, particularly those highly motivated ones, rated blended learning highly while those with lower motivation levels and less comfort to technologies rated blending learning more poorly. These findings reinforce the importance of the open research question identified in the previous section on finding relatively lower effort interventions that can produce meaningful results in asynchronous settings (to lessen faculty workload and ease acceptance) and in identifying heterogeneous effects among students of such treatments.

In summary, these studies generally reinforce the findings of Varkey et. al.: paying attention to the outside of class learning experience is important, well-structured media content makes self-study easier, educational activities structured around the learning cycle have seen positive results, and it is important to pay attention to the adoption difficulties. Combining these two literatures, the following suggestion provides some best practices from combining both sets of literature.

→ Takeaways:

Key question 2: Does structured asynchronous learning affect student engagement and satisfaction?

Well-planned asynchronous activities increase student satisfaction and engagement, though results vary by student characteristics.

Key question 3: What are the best practices for asynchronous learning?

Effective asynchronous learning requires activities that engage the full learning cycle, incorporate multimedia, and include timely instructor communication.

Key question 4: What are the implementation hurdles for asynchronous learning?

Major implementation hurdles involve faculty time constraints and training, in addition to student technology access and acceptance challenges.

Actionable Recommendations

Class design

DKU instructors should design out-of-class (asynchronous) activities that actively engage students in the full learning cycle—exposure to new material, reflection, and application. This can be done by:

- Creating structured pre-class materials (e.g., short videos, readings, or mini-lectures) that introduce key concepts
- Incorporating guided reflection activities, such as short written responses, self-check quizzes, or prompts that encourage students to think about what they have learned
- Designing application-based tasks, including problem-solving exercises, case analyses, or discussion questions that require students to use new knowledge
- Embedding opportunities for metacognition, such as asking students to assess their understanding or identify areas of confusion
- Providing timely and targeted feedback (can be automated) on these short assignments to reinforce learning and correct misunderstandings

In addition, asynchronous activities should intentionally include interaction:

- Instructor–student interaction (e.g., Q&A forums, feedback, short check-ins) to clarify misconceptions and sustain engagement
- Student–student interaction (e.g., discussion boards, peer review, collaborative tasks) to promote deeper learning and higher-order thinking

Finally, instructors should prioritize well-designed multimedia content:

- Use short, focused videos and modular materials that allow students to learn in manageable segments
- Enable students to revisit and review content at their own pace

Training

To implement these practices effectively, DKU instructors may require:

- **Pedagogical training** in blended and asynchronous course design, including how to structure activities around the learning cycle
- **Technical support** for creating and delivering multimedia content (e.g., video recording tools, learning management systems)
- **Guidance on workload management**, including strategies for efficiently providing feedback and facilitating online interaction
- **Access to instructional design support**, such as templates, examples, or consultations

Students may also need support to fully benefit from these approaches:

- Orientation to digital tools and platforms used in courses
- Guidance on how to engage effectively in asynchronous learning (e.g., time management, participation expectations)
- Reliable access to internet resources

Scope

These recommendations are especially relevant in:

- **Blended or flipped courses**, where foundational knowledge is introduced outside of class and in-class time is used for application and discussion
- **Large-enrollment courses**, where structured asynchronous materials can support consistency and scalability

They are also particularly valuable in contexts where:

- Students benefit from revisiting material multiple times
- Instructors aim to increase student autonomy and ownership of learning
- There is a need to balance instructional effectiveness with time and resource constraints

Conclusion

Returning to the key questions identified in the introduction, all of them have at least partial answers.

1. Is structured asynchronous learning more effective in measures of student achievement than traditional approaches?

   According to the blended learning literature, the answer appears to be largely yes. While the outcome depends in part on how "traditional approaches" are defined, a well-designed set of activities that incorporates active learning based on the Kolb learning cycle is likely to outperform conventional homework assignments. However, further research is needed to confirm this empirically.

2. Does structured asynchronous learning affect student engagement and satisfaction?

   The answer to this question also appears to be largely yes, and in a positive direction. Students report greater satisfaction and increased engagement with well-planned asynchronous activities. However, these effects are likely to vary across different student characteristics.

3. What are the best practices for asynchronous learning?

   As outlined in the Actionable Recommendations section, effective asynchronous learning includes activities that fully engage the learning cycle, incorporate appropriate multimedia content, and involve timely communication from the instructor. Identifying which of these activities offer the greatest benefit with the least faculty time investment remains an important area for further research.

4. What are the implementation hurdles for asynchronous learning?

   Faculty time constraints and training is likely the largest hurdle for adoption of the best practices recommendations, though student technology access and acceptance are also important factors.

Some significant areas for future research include:

<u>Identifying High-Value, Low-Effort Interventions</u>

Future research must focus on determining which specific asynchronous activities provide the greatest learning benefit for students with the least investment of faculty time. This is important because the perceived increase in instructor workload is currently the largest implementation hurdle for adopting best practices. Finding these relatively lower-effort interventions is essential for easing faculty acceptance of structured asynchronous learning.

Analyzing Heterogeneous Student Outcomes and Persistence of Effects

Research is required to determine how student characteristics influence the efficacy of asynchronous activities, as current findings show a highly heterogeneous student response. While highly motivated students rate blended learning favorably, those with lower motivation or less comfort with technology rate it more poorly, reinforcing the need to identify these varying effects among students. Furthermore, studies must investigate whether the positive results on student engagement and interest are long-lasting or merely a novelty effect.

Integrating Artificial Intelligence (AI) Tools into the Learning Process

How best to integrate AI into asynchronous learning is a pressing and significant issue for future investigation. AI offers substantial potential, particularly in providing students with immediate, targeted feedback. However, this research must also address the risk of students becoming overly reliant on AI as a learning crutch, which necessitates the study of effective integration and relevant safeguards.

In summary, although many aspects of asynchronous learning require further investigation and empirical validation, the existing literature—both on asynchronous learning and blended learning—suggests that rethinking how students use their time outside of class could lead to substantial educational gains.

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