



Autonomy vs. Teamwork, As a Determinant of Active Learning

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Abstract

Traditional educational models often position teamwork as central to active learning, assuming that collaboration enhances academic performance and organizational skills. This study challenges that assumption by examining student autonomy as a key driver of learning outcomes. Using a self-selection design, students chose between individual and group learning environments, and their performance and study habits were analyzed. Results show that students who preferred solo work demonstrated stronger organization, greater proactive engagement, and higher academic achievement than their group-based peers. These findings suggest that active learning is most effective when autonomy is foregrounded. The study supports a more inclusive conception of active learning aligned with Universal Design for Learning, accommodating both independent and social learners.

Keywords: Universal Design for Learning, Collaborative Learning, Procrastination

Introduction and Background

Education has long been characterized by progression from passive knowledge consumption to active knowledge creation. As children, we learn through imitation—modeling the behaviours of parents, siblings, and teachers. In traditional classroom settings, this imitation extends to reading, writing, and mathematical reasoning, guided by direct instruction. However, if the goal of education is not merely to produce imitators but to cultivate independent thinkers and innovators, then the nature of active learning must be re-examined.

Active learning, at its core, seeks to facilitate the transition from passive reception to meaningful cognitive engagement and knowledge production. Bloom's Taxonomy provides a useful framework for this shift, organizing learning into six hierarchical categories: remembering, understanding, applying, analyzing, evaluating, and creating. Traditional classroom instruction often emphasizes the lower tiers of this taxonomy, such as memorization and basic comprehension, while active learning aspires toward the higher tiers, including evaluation and creation. Recent studies of innovative teaching practices in higher education continue to highlight the role of active and inquiry-based learning approaches in fostering critical thinking and student engagement (Thomas et al., 2025).

Constructivist theories of learning support this orientation by emphasizing that knowledge is not simply transmitted from teacher to student but is actively constructed by the learner through meaningful engagement. Social constructivism extends this idea by highlighting the role of peer interaction and collaboration in facilitating learning. It is from this perspective that group work has become a cornerstone of many active learning environments.

However, this widespread emphasis on teamwork assumes that collaborative learning is universally beneficial—an assumption that has often gone unquestioned. This study challenges that assumption by investigating the role of learner autonomy in academic success. While teamwork may support active learning under certain conditions, it may also hinder it when imposed on students who learn better independently. This inquiry focuses on whether student autonomy—not group membership—is the more critical factor in fostering deep learning and academic achievement. Recent analyses of higher-education research trends indicate that learner autonomy has become a central theme in contemporary pedagogical scholarship, reflecting growing recognition of the importance of independent learning strategies and self-regulated study practices (Son & Hai, 2023).

By examining students' performance and study habits in environments where they could choose to work alone or in teams, this study explores how individual agency influences learning outcomes. The findings raise questions about the presumed superiority of collaborative learning, suggesting that respecting students' learning preferences may be essential to achieving the true goals of active learning.

Literature Review

A growing body of research has emphasized the importance of autonomy in fostering deep learning and academic success. Nilson (2013) found that time management alone accounts for approximately 30% of a student's academic performance—more than any other single factor. Yet many students procrastinate in dealing with this challenge due to patterns of self-deception, denial, and anxiety (Nilson, 2013). These tendencies become exacerbated in team-based environments, where individual accountability can become diffused. Recent research on learner autonomy confirms that the topic has become an

increasingly prominent focus in higher education scholarship, with a substantial growth in publications over the past two decades and strong links to teaching methods and learning strategies that promote independent learning (Son & Hai, 2023). Self-regulated learning research shows that learner autonomy is a key determinant of engagement and success, particularly in flexible or technology-enhanced learning environments (Turan et al., 2022; Jin et al., 2023).

While social constructivist models have become dominant in education theory—particularly in disciplines like science where collaborative lab work is essential—it is important to recognize the contextual limitations of these studies. Much of this research is based on environments where teamwork is dictated by resource constraints or disciplinary norms, not necessarily by pedagogical superiority (Chi & Wylie, 2014). Extending such conclusions to other contexts requires caution, especially when those conclusions rest on aggregate data that obscure individual variation. While asynchronous and virtual learning may not contribute to the students' sense of cohesion, social interaction, and task interaction compared to a live class (Clark & Kwinn, 2007), it is important not to confuse these factors with learning as mastering a discipline-specific competency. Accordingly, the positive results of socially constructivist pedagogies may not be due to their collective element but due to their constructive element (Chi & Wylie, 2014). This undermines the *ceteris paribus* assumption, as causal relationships cannot be reliably inferred when multiple instructional variables are altered simultaneously.

Asynchronous instruction, in contrast, has proven particularly effective in delivering the lower tiers of Bloom's Taxonomy, whereby students can bootstrap themselves through self-explanation, and thereby be more prepared for higher order cognitive tasks (Chi & Wylie, 2014). More recent research on self-regulated learning in higher education also highlights how digital learning environments increasingly support student autonomy by enabling personalized pacing, self-monitoring, and reflective learning practices (Lan & Zhou, 2025). Studies on blended and digital learning environments indicate that self-regulated and autonomous behaviors drive student success more than mere participation in collaborative tasks (Nikolopoulou, 2023; ElSayad, 2024).

According to Piaget, learning is most robust when students actively construct their own understanding (Mooney, 2000). "What is important is that there is interaction between the person and his or her environment" (Rodgers, 2002, p. 846). Such interaction and communication can be between teacher-student, student-student, and student-information. All three can play a pivotal role in learning, depending on the student, subject matter, and level of education (Smart et al., 2012). The value of such interaction is enabling the learner to refine and deepen their views through exposure to other views and mutual criticism. Research on learner agency further highlights that empowerment, decision-making, and reflective self-assessment are core components of autonomous learning that support lifelong educational success (Gupta et al., 2024).

While collaboration can be a powerful tool for learning, it is not a panacea. Its success depends on clearly defined roles, goals, and instructor oversight (Ambrose, 2010; Bates, 2015). When these conditions are absent, teamwork risks becoming a barrier to learning, due to its susceptibility to free riding. Studies on collaborative activities in hybrid and online environments show that without careful orchestration, group tasks can increase workload and reduce the effectiveness of peer interaction (Bach & Thiel, 2024; Ortega-Arranz et al., 2024). Similarly, Dewey's notion of instructor professionalism entails cultivating student autonomy—a condition that cannot be achieved without individual accountability (Rodgers, 2002). Indeed, the cognitive subject is *constructed* through its clash with the constraints in its experience. The subject is not aloof or untouched, unlike an artisan making an artifact. The subject is *the artifact*, and knowledge is but one aspect or property of them (Von Glasersfeld, 1982).

Active learning has been the subject of extensive research, with studies emphasizing its benefits over traditional lecture-based instruction (Bonwell & Eison, 1991; Prince, 2004). However, much of the literature focuses on group-based active learning models, such as problem-based learning (Hmelo-Silver, 2004) and cooperative learning strategies (Johnson et al., 1998). While these approaches have been shown to enhance engagement, they do not always lead to higher-order cognitive development, particularly when students are placed in groups without choice. Recent studies on inquiry-based and active learning in higher education similarly emphasize that these pedagogies can foster engagement and critical thinking, but their effectiveness depends strongly on how they are implemented within specific instructional contexts (Thomas et al., 2025). While cooperative learning's impact varies significantly by discipline and instructional design, autonomy support remains a crucial moderator of student learning outcomes (Kilpeläinen-Pettersson et al., 2025).

While Vygotsky's zone of proximal development (ZPD) suggests that peer interaction can facilitate learning (Vygotsky, 1981), it does not imply that collaboration is universally superior to solitary study. Universal Design for Learning (UDL) stresses the importance of offering multiple means of engagement to accommodate diverse learning styles. These insights suggest that a one-size-fits-all approach to active learning—one that mandates teamwork—may be counterproductive for a subset of students who thrive in independent settings.

This study builds upon these theoretical foundations by empirically testing the hypothesis that student autonomy, rather than teamwork, is the primary driver of active learning. Through an analysis of self-selected learning environments, we examine whether students who choose to work alone demonstrate higher academic performance and organizational skills compared to their team-based peers.

Method

Given the increasing emphasis on teamwork in contemporary education, we sought to investigate whether student autonomy serves as a stronger driver of academic success than teamwork. Our study was inspired by the principles of Universal Design for Learning (UDL) and insights from Scandinavian education systems, which emphasize student choice and self-regulation.

Hypotheses

It is almost a matter of consensus in schools and colleges that teamwork contributes to academic achievement as well as organizational skills. However, we hypothesized that student autonomy, rather than teamwork, is the primary catalyst for active learning. We found no studies that test this, so we decided to conduct our own. Specifically, we aimed to test two key assumptions, which are often taken for granted in education:

1. Students who work in teams tend to achieve higher academic success than those who work independently.
2. Students who work in teams tend to exhibit better organizational skills than those who work independently.

In both hypotheses, the independent variable is working in groups or solo. The dependent variables in the two hypotheses, respectively, are academic achievement and time management.

Study Design

The study was conducted through a complementary course of economics. At the beginning of the term, students were given the following survey.

If you had the choice, which of the following options would you choose for the weekly readings and class activities?

- I prefer to read one chapter and work in a team in class
- I prefer to read two chapters and be always alone in class
- No strong preference

The emphasis on always working alone despite a greater workload was meant to identify autonomy. Approximately one-third of the participants selected each category. Students were then placed into their chosen learning environments for a two-week trial period, after which they were allowed to either continue with their initial choice or switch

to another option. Group members were also allowed to select their teammates.

We assessed academic performance through two tests designed to measure competencies at the creation and evaluation levels of Bloom’s taxonomy. We measured organizational skills and autonomy by tracking when students completed pre-class activities, which could be done at any time without dependency on others.

Results
Academic Performance

Table 1 illustrates student grades over two exams. The percentages are relative to the total sample size of 64 scores. Figure 1 represents this trend and disparity graphically.

Table 1: Student grade category based on group status

Grade	Group (f)	Solo (f)	Group (%)	Solo (%)
<60	15	6	23.44	9.38
60s	8	5	12.50	7.81
70s	10	2	15.63	3.13
80s	6	8	9.38	12.50
90s	1	3	1.56	4.69
Total	40	24	62.5	37.5

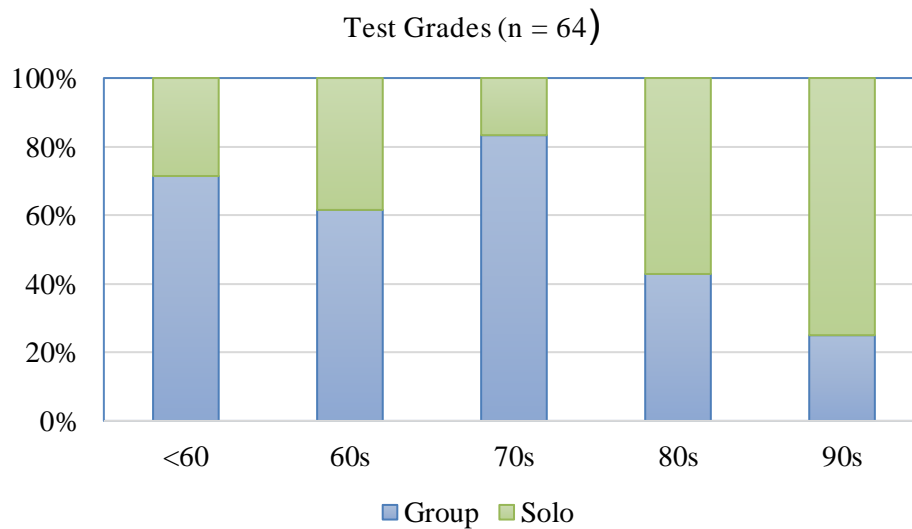


Figure 1: Proportion of group and solo performers in each grade category, relative to all scores

Key findings include:

- The class average over the two exams was 64.17. The average grade of solo learners was 71.43, which is approximately 7 points (out of 100) higher than that of group members ($p < 0.05$).
- 46% of solo learners scored in the 80-90 range, compared to 18% of group learners.
- An F-test indicates that the variances of the two cohorts were not significantly different ($p > 0.3$).

Organizational Skills & Autonomy

To measure student motivation and autonomy, we tested the extent to which students tend to procrastinate their individual weekly activities. Table 2 indicates the results according to group status. The percentages are relative to the total sample size of 189 submissions. The difference is the solo percentage minus the group percentage. Figure 2 shows the percentages graphically.

Table 2: Individual assignment submission times of group and solo members, including those who indicated no strong preference

Days Before Due Date	Group (f)	Solo (f)	Group (%)	Solo (%)	Difference (%)
Late	20	6	8.70	10.58	3.17
0	41	13	18.84	21.69	6.88
1	33	26	37.68	17.46	13.76
2	14	11	15.94	7.41	5.82
3+	12	13	18.84	6.35	6.88

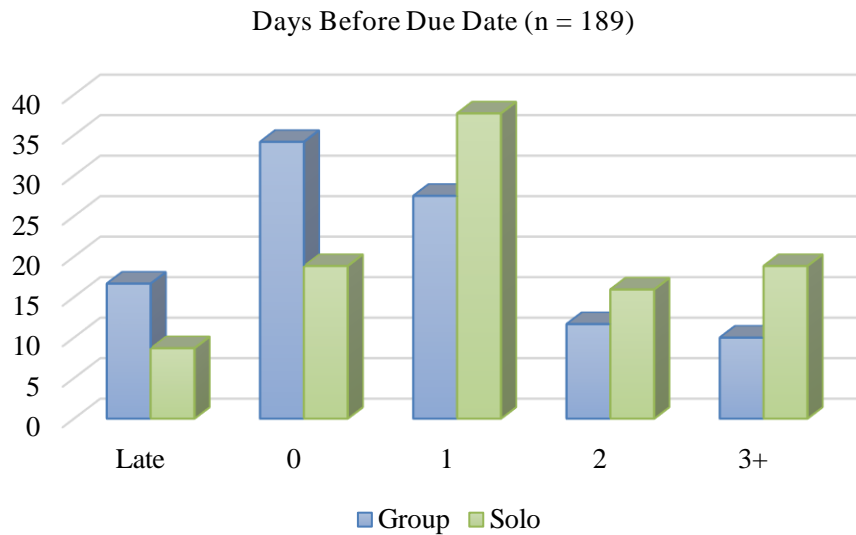


Figure 2: Proportion of group and solo learners' advance submissions, relative to class total

A stark contrast emerged in students' time management habits:

- Over 70% of solo learners completed the pre-class activities at least one day before the deadline.
- Over 50% of group learners submitted on the due date or late.
- A t-test indicates a strongly significant difference between the submission patterns of group learners and solo learners ($p < 0.01$).

The majority of students who indicated no strong preference for working alone or in a team were placed in a team, and they stayed in a team after the two-week trial, with the exception of one student. Table 3 shows the comparison between group and solo learners who *chose* to be so (n = 109).

Table 3: Individual assignment submission times of group and solo members, excluding those who indicated no strong preference

Days Before Due Date	Group (f)	Solo (f)	Group (%)	Solo (%)	Difference (%)
Late	6	6	5.50	5.50	0
0	12	13	11.01	11.93	0.92
1	14	26	12.84	23.85	11.01
2	5	11	4.59	10.09	5.50
3+	3	13	2.75	11.93	9.17

Taking students' preference into consideration does not modify the results significantly. Over 45% of group learners submitted their work on the due date or late, and the difference between the two cohorts was still statistically significant ($p < 0.05$).

Discussion

The findings of this study challenge the prevailing assumption that teamwork inherently enhances academic achievement and organizational skills. Instead, our results suggest that autonomy is a crucial determinant of success. Students placed in teams did not outperform solo learners in terms of academic achievement or organizational skills. In fact, solo learners—especially those who actively chose to work independently—tended to perform better academically, and demonstrated greater time management skills. Students placed in groups exhibited greater procrastination tendencies than solo learners, even though pre-class activities were individual assignments and could be completed independently of group coordination. Therefore, we have compelling evidence to reject both hypotheses presented above.

If we exclude students who chose “no strong preference,” group members achieved a slightly higher average score on the two assessments (72.5) compared to solo learners (70.4). However, this difference was not statistically significant ($p > 0.34$). These findings suggest that students who voluntarily choose to work in teams may perform as well as, if not better than, those who prefer to work independently. The issue arises primarily when students are placed into groups without their consent, which may disrupt their motivation or engagement. It is also possible that performance outcomes are influenced by underlying factors such as self-motivation or individual learning preferences, rather than group dynamics alone. Therefore, student choice appears to be a critical variable in the effectiveness of collaborative learning environments.

In terms of time management, however, the results remain significant, albeit a bit less (at the 5% level instead of the 1% level) if we only focus on students who chose how to work. This suggests that procrastination patterns are less dependent on student choice, and more a result of other factors, such as personality and study habits. The fact that group

members tended to procrastinate more suggests that persistent participation in teamwork seems to take its toll on students' time management skills. This is an aspect of group dynamics which is not adequately addressed in the literature.

We can glean the following take-away lessons from our research:

- Students who voluntarily chose to work in teams performed as well as, if not better than, their solo counterparts. However, students placed into groups without choice exhibited weaker study habits and time management skills. This highlights the importance of respecting individual learning preferences.
- While teamwork remains a valuable skill, it is not a prerequisite for active learning. Many students thrive in asynchronous, self-paced learning environments, which allow them to actualize their competencies independently.
- The organizational benefits commonly attributed to teamwork may, in reality, be contingent on student autonomy rather than group dynamics. Teamwork can certainly be effective, but only when it is freely chosen and internally motivated.
- The COVID-19 pandemic underscored the necessity of individual autonomy in learning. Remote education required students to develop self-regulation skills, which turned out to be a key determinant of success.
- Learning communities are not limited to physical classrooms or synchronous activities. The notion that active learning requires group collaboration, though attractive, is not effective. Authentic learning often occurs asynchronously, where students engage in self-directed exploration at their own pace.
- Group learning environments are susceptible to free-riding and the bystander effect, which can diminish both educational outcomes and inclusivity. Rather than focusing solely on collaborative learning spaces, educators should design environments that empower students to cultivate autonomy.

Our data challenge the binary of passive versus active learning by introducing a third axis: authentic autonomy. Active learning is not merely about doing more or doing it together; it is about doing it meaningfully. Autonomy, not activity alone, distinguishes authentic engagement from superficial participation. Thus, the emphasis on teamwork in many contemporary pedagogies, while well-intentioned, may inadvertently marginalize students whose strengths lie in self-directed, internally motivated work.

This insight is especially relevant in light of the Universal Design for Learning (UDL) framework and Scandinavian education models which emphasize choice, flexibility, and learner agency. The future of learning is not merely a transition from teacher-centered classrooms to collaborative "smart board" environments, but toward asynchronous, community-based learning spaces that center the learner as an autonomous agent in a shared, yet flexible, ecosystem.

Conclusion

While team-based learning has the potential of facilitating deeper engagement with the material and stronger mastery of competencies, it may undermine the goals of active learning when its conditions are not met. Moreover, collaboration can yield excellent outcomes *when it is a genuine choice*. But when imposed uniformly, it risks undermining the potential of those learners who function best in solitude. Student autonomy must therefore be recognized not as a luxury, nor as an exception, and much less as an abnormality, but as a legitimate foundation for academic success. Recent research on self-regulated learning in higher education supports this view, highlighting the importance of student agency and autonomy in promoting deeper engagement and effective learning strategies (Lan & Zhou, 2025). Moreover, research on learning analytics suggests that structuring opportunities for student self-regulation and reflection enhances both engagement and outcomes in online contexts (Kleimola et al., 2025).

An old proverb, famously quoted by Milton Friedman in the context of international trade, says: “One moves fastest who moves alone” (Friedman & Friedman, 2002, p. 73). Though Friedman quoted this proverb when advocating unilateral free trade between countries, the metaphor extends seamlessly to education. Just as free trade relies on autonomy and individual initiative, so does active learning. Our findings suggest that learners often thrive when given the freedom to shape their own educational paths.

The findings of this study underscore the importance of recognizing the diversity of learning preferences among students. Introversion, in particular, should not be treated as an exception or a limitation. A substantial proportion of college students—approximately one-third in our study—demonstrated a preference for working independently and appeared to learn more effectively in solitary settings. Forcing such students into collaborative environments may not only hinder their academic performance but also disregard their individual learning strengths. Educational practices should, therefore, be flexible enough to accommodate these differences, allowing students to choose the learning mode that best supports their autonomy and cognitive engagement.

Many educational institutions have evolved beyond the traditional, teacher-centered instruction toward more student-driven and hands-on environments. The next step is clear: supporting students as autonomous learners embedded within an asynchronous learning community. In such a model, learners are empowered to engage with material, peers, and instructors on their own terms—guided but not dictated. This shift requires practical adjustments: giving students meaningful choices in how they learn, creating environments that value both collaboration and independence, and designing assessments that reflect individual growth. By doing so, we prepare students not only for academic success but for lifelong learning in an increasingly complex world.

Emphasis on teamwork irrespective of students’ individuality and personality traits

can easily lead to conformity and free-riding, while compromising authenticity, autonomy, and creativity, which are at the core of active learning. “What avail is it to win prescribed amounts of information about geography and history, to win the ability to read and write, if in the process the individual loses his own soul?” (Dewey, 1997, p. 49).

Limitations and Future Research

This study was conducted in a college-level, online context, which may have influenced group dynamics and learner behaviour. The results may differ in institutions where students share the same space with the same classmates for multiple courses, such as in many primary and secondary levels. Further, a potential counterargument would be Vygotsky notion “that developmental processes do not coincide with learning processes. Rather, the developmental process lags behind the learning process” (Vygotsky, 1981, p. 90). Future research could replicate the study in in-person or hybrid settings and at different educational levels to explore whether the observed trends hold under varying conditions. Additionally, exploring how structured group facilitation or training in collaborative skills might alter the impact of group learning would be a valuable next step.

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