



EXPANDING STEM TALENT  
through Upward Transfer

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## Exploring the Relationship Between Active Learning, Transfer Intent, and Transfer Self-Efficacy Among Students Beginning in STEM Fields at Two-Year Colleges

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**Abstract:** In this study, we explore the linkage between active learning—pedagogical practices that engage students intellectually and encourage thinking, problem-solving, questioning, or analyzing information—and two-year college students’ intent to transfer to four-year institutions. Analyzing a combination of students’ survey and transcript data, we found that active learning has a direct, positive effect on student intent to transfer into STEM-related fields at four-year institutions, as opposed to having no intent to transfer. Active learning also demonstrates an indirect effect on intent to transfer by boosting transfer self-efficacy (i.e., students’ confidence in their ability to handle the transfer process and requirements), a motivational belief that was found to cultivate intent to transfer.

**Study Focus:** Explore the potential linkage between active learning and student intent to transfer and whether and how transfer self-efficacy may mediate this relationship.

**Method:** This research leverages data collected from the baseline study of the STEM Transfer Survey of roughly 3,000 students enrolled in STEM programs or courses at Wisconsin’s two-year institutions with upward transfer as part of their mission. The survey instrument was purposefully developed to measure learning, motivational, and contextual factors that may contribute to upward transfer in STEM. The final study sample included 1,668 students who responded to the STEM Transfer Survey (for a response rate of 56.6%) and who were first-time students beginning in STEM programs or courses in Fall 2014. Of this sample, 497 (29.8%) did not intend to transfer, while 716 (42.9%) intended to transfer into STEM fields and 453 (27.2%) intended to transfer into non-STEM fields at four-year institutions.

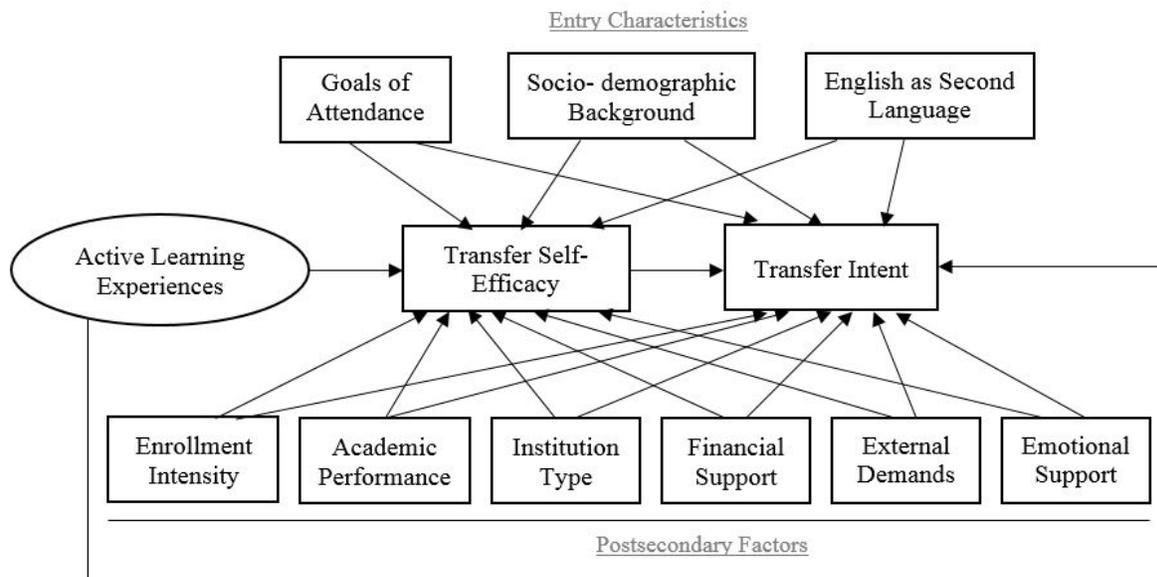
**Analysis:** We conducted a structural equation modeling analysis to explore the relationship between active learning and student intent to transfer and whether and how transfer self-efficacy may mediate this relationship. This technique is appropriate for examining if the relationship between the predictors and outcome variables is mediated by a third variable. That is, this method helps answer whether the two variables of interest (i.e., active learning and transfer intent) are related to each other in a straightforward manner, or whether the third variable (i.e., transfer self-efficacy, referred to as the mediator) helps carry the relationship between the two. As a result, the “direct effect” refers to the uninterrupted relationship between two variables.

<http://stemtransfer.wceruw.org>

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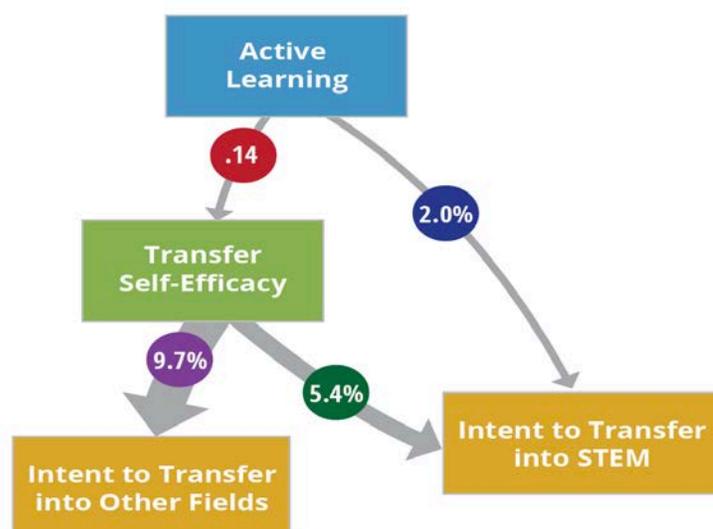
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We further controlled for a set of variables that have been found to influence students' intent to transfer in previous studies. These variables included: socio-demographic background (e.g., gender, race/ethnicity, age), initial goal of attending the current two-year college, financial and emotional support from family and peers, external demands (e.g., childcare obligations, employment), type of institution currently attending (UW Colleges versus Wisconsin Technical College System institutions), enrollment intensity, and the number of courses completed during their first semester of study. By accounting for these variables, we were able to focus on the unique relationship between students' engagement in active learning and their upward transfer intent. The following figure describes our conceptual model that incorporates all of these elements.



**Key Findings:** The direct and indirect effect (via transfer self-efficacy) of active learning on intent to transfer into STEM (compared against having no transfer intent) appeared to be positive and statistically significant, controlling for student entry characteristics and postsecondary contextual factors as well as transfer self-efficacy. As shown in the graph on Page 3 of this research brief, the more frequently students engage in active learning, the more likely they will be to intend to transfer into STEM as opposed to having no transfer intent. This direct effect remains salient even after we controlled for a number of confounding variables. This finding reinforces active learning practices as a promising approach to not only improving pedagogy but also bridging the gap between STEM access and STEM success.

Moreover, the more active learning students are involved in, the higher their transfer self-efficacy. In turn, a higher level of transfer self-efficacy is related to a stronger likelihood to intend to transfer into a STEM field at a four-year institution, as opposed to not intending to transfer. This result points to active learning as a potential lever that two-year colleges can utilize to promote upward transfer in general. More importantly, active learning seems to cultivate students' confidence in transferring, therefore keeping open, rather than limiting, their educational options.



.14

The more active learning students are involved in, the higher their transfer self-efficacy. A one-point increase in students' active learning scale (a 5-point scale with 5 indicating the most amount of active learning) is associated with a .14 point increase in their transfer self-efficacy scale (a 5-point scale with 5 indicating the highest level of self-efficacy).

9.7%

The higher self-efficacy students have about their ability to handle the transfer process, the stronger their intent to transfer into a non-STEM field at a four-year institution. An increase by one standard deviation above the mean in a student's transfer self-efficacy scale (a 5-point scale with 5 indicating the strongest transfer self-efficacy) is associated with a 9.7% increase in the probability of the student having the intent to transfer into a non-STEM field at a four-year institution, as opposed to not intending to transfer.

5.4%

The higher self-efficacy students have about their ability to handle the transfer process, the stronger their intent to transfer into a STEM field at a four-year institution. An increase by one standard deviation above the mean in a student's transfer self-efficacy scale (a 5-point scale with 5 indicating the strongest transfer self-efficacy) is associated with a 5.4% increase in the probability of the student having the intent to transfer into a STEM field at a four-year institution, as opposed to not intending to transfer.

2.0%

The more active learning students are involved in, the higher their intent to transfer into a STEM field in a four-year institution. An increase by one standard deviation above the mean in a student's active learning scale (a 5-point scale with 5 indicating the most amount of active learning) is associated with a 2.0% increase in the probability of the student having the intent to transfer into a STEM field at a four-year institution, as opposed to not intending to transfer.

## Implications:

- **Measuring if and how active learning is already present in the classroom.** An emphasis on assessment would help locate gaps to be filled, methods already in use, and the availability of instructors to purposefully devote time to reflecting on active learning as it relates to their courses. Furthermore, assessment could help identify faculty members who successfully incorporate active learning strategies in their classrooms, thereby locating people who can share their knowledge and potentially teach others how to make changes in their own classrooms.
- **Providing professional development on creating opportunities of active learning.** Professional development opportunities could be offered as a means of ensuring that all instructors are equipped with the knowledge and skills to cultivate engaging lessons for their students. Institutions could harness the talent of existing personnel to help determine which instructors could teach others how to plan for and facilitate engaging lesson plans, even practicing their techniques on one another in a group format.
- **Integrating active learning as a regular component of teaching and curriculum development.** As active learning serves as the cornerstone of students' confidence in upward transfer, incorporating this practice in the curriculum regularly is deemed helpful to prepare students for transfer. Administrative and department leaders should communicate the positive outcomes of active learning with faculty members in order to encourage instructors to develop the curriculum that integrates active learning as a vital part of the instruction.