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Impact of Intrusive Advising on STEM Student Retention and Success: An Empirical Study

Rajiv Dewan

Associate Professor of Biology, Department of Biological and Physical Sciences, Saint Augustine's University
rajiv@st-aug.edu

Abstract: ***Intrusive advising is a type of student advising characterized as a highly interactive and proactive student-centered process. Intrusive advising, like traditional advising frameworks such as developmental and prescriptive advising, is essential for identifying and designing remediation approaches to ensure student success and retention. Intrusive advising involves deliberately administrating Tinto's academic and social integration objectives. Data indicates that intrusive advising is an effective strategy for improving student undergraduate success and academic retention rates. Intrusive advising may also advance research training and career development goals. Most of the data on this topic focuses on the first two years of college. More data is needed to explore the impact of intrusive advising on the last two years of college to understand better how intrusive advising mediates persistence, graduation, and entry into graduate school, professional school, or the job market. Further, more targeted information is needed to explore how intrusive advising improves student progression and degree completion for science, technology, engineering, and math (STEM) majors. The current article has significant implications for student advising policy and practice. Intrusive advising methods may be essential for minority-serving institutions with retention rates well below the national average.***

Keywords: intrusive advising, retention, undergraduate research, proactive, academic achievement

1. Introduction

The three central canonical advising practices include developmental, prescriptive, and intrusive advising [1-2]. Developmental advising focuses on the long-term development of students' academic skills and career competencies. Prescriptive advising refers to student advising addressing a specific problem or concern (e.g., registration, degree audit). Intrusive advising is a systematic and developmental process designed to improve high-risk college students' academic success skills and retention. The advisor initiates first contact and targets students to ensure success and diploma acquisition. Robert Glennen is the first scholar to suggest that counselors and advisors must be proactive and initiate student contact early and often to provide necessary academic support and information about essential campus resources that are conducive to student longevity and academic achievement [3-4]. Earl later pontificated fundamental intrusive advising methods in a seminal publication in 1988 [5-6]. Earl elucidated seven beneficial strategic activities that positively impact scholastic perseverance, particularly for students on probation. Earl's seven intrusive advising strategies involved communication, solutions exploration, assessment, assessment review, development of academic plan, follow-up communication, and course scheduling. Based on Earl's operational definition, intrusive advising is a methodical and coordinated process designed to disseminate essential information to college students to facilitate the transition from high school to college and transmit beneficial skills to accelerate achievement and promote persistence. In intrusive advising protocols, student participation is required during the first two years. Mandating student involvement is paramount because students don't often seek help even when their performance, attendance, and grades necessitate intervention. Intrusive advising presupposes a greater amount of advisor accountability. In intrusive advising, students attend mandatory advising sessions, complete predesigned assessments or assignments that promote student academic engagement and develop internal strategies to encourage compliance with the departmental degree plan.

Many intrusive advising principles and advising evaluation systems are based on Vincent Tinto's theories of student departure and institutional integration [7-8]. Institutional integration encompasses two major focal points: academic and social integration. Academic integration relates to students' connection to their coursework and ability to comprehend content and identify study skills and time management strategies. Social integration refers to a student's relationship with campus resources, faculty, and classmates outside the classroom. Students who perform well in their classes and have high GPAs display high academic integration, while students who perform poorly on coursework and fail to comprehend course content tend to have low academic integration. Students with strong relationships with faculty and classmates outside class display higher social integration than students without meaningful relationships. The Institutional Integration Scale is a quantitative tool used to examine Tinto's framework on college campus practices and outcomes [9]. Flowers et al. utilized a quantitative approach to examine Tinto's institutional integration model on STEM distance education students and found that in the online environment, students reported reduced social integration compared to traditional STEM courses [10]. The study's results were used to make positive changes to the online course to improve social integration.

In combination with other surveys, using a pre-test and post-test design, the Institutional Integration Scale should be incorporated in the assessment and evaluation arm of

orientation programs, grant-funded STEM broadening participation programs, courses, and graduation requirements.

Leary et al. [11] used the Institutional Integration Scale to demonstrate that cohort scheduling, a method used in intrusive advising protocols, may be effective for STEM students to facilitate social integration and improve students' views of faculty. There was no significant difference in academic integration or retention rates compared to students subjected to traditional scheduling methods. STEM departments must consider including intrusive advising at the course level through periodic advising-based assignments for each STEM course. Course-based intrusive advising activities may lead to better short-term and long-term student outcomes. Intrusive advising should also be incorporated into STEM intervention programs (SIPs) focusing on academic success and careers after graduation. Moreover, minority students may benefit from intrusive advising protocols infused with academic integration procedures due to still prevalent reports of inadequate preparation for college academics [12-13].

2. Intrusive Advising for Retention and Academic Achievement

Colleges and universities continue to grapple with poor academic outcomes and dwindling retention rates for all fields of study. This is especially true for majors historically considered challenging and demanding (e.g., science and technology). Intrusive advising strategies may help change academic achievement trajectories for students who lack focus and motivation. Thomas demonstrated that when intrusive advising techniques were applied to remedial courses in core subjects typically designed for first-year college students, there was a significant increase in the pass rate compared to courses that lacked intrusive advising-based interactions [14]. Recently, educational researchers employed intrusive advising techniques in a first-year seminar-infused introductory course designed for engineering students [15]. The seminar course focused on topics of immense benefit to new college students, such as graduation requirements and access to campus resources. Data from pre-test and post-test surveys revealed that undergraduate students possessed more knowledge of critical factors that are known to impact success. Unfortunately, this study did not conduct the same seminar using standard non-intrusive advising techniques, so evaluating the true impact of intrusive advising on student perceptions is difficult. Another beneficial seminar conducted in the community college environment used a qualitative methodology to explore student views on intrusive advising protocols [16]. Researchers showed that because of participation in intrusive advising, students generally displayed higher levels of self-efficacy and demonstrated motivation to achieve various academic goals throughout the semester.

3. Intrusive (Proactive) Advising Techniques

A firm understanding of the basic meaning of intrusive and proactive is a great starting point for developing valid and reliable approaches to combat poor grades and retention rates in STEM. The term intrusive refers to engagement without an invitation. Merriam-Webster's dictionary defines proactive as acting in anticipation of future problems, needs, or changes. Techniques in which advisors, instructors, and program directors invent ways to initiate student communication or make first contact to establish strong, beneficial relationships with STEM students are crucial. A hallmark of intrusive advising is that advisors don't wait until a problem arises; instead, they intervene early to prevent problems from occurring. Before the semester or STEM program begins, advisors must assess and analyze student comprehension of essential course content, study strategies, and campus resources. Based on the analysis of student results, advisors must take immediate action to mitigate potential problems. Email, phone calls, voicemail, texting, videoconferencing, and other technologies are readily available to conveniently engage with students regularly. For some students, regular face-to-face meetings may be more appropriate. Required weekly or bi-weekly meetings could address study skills, career exploration, and time management skills. Part of the intrusive method is to understand that all students are different, and the intrusiveness levels must differ for each student or group. During the initial assessment period, exploring which communication method is best for each student may be prudent. For students who are difficult to track down, proactive advisors may even go to the student's classroom to let the student know how much they care about their success and progression. Maintenance of the advising relationship is paramount for student development.

In addition to meeting with students during midterms and at the end of the semester, proactive advisors may inquire about an upcoming exam, presentation, or student project to offer help or encouragement. Comprehensive intrusive advising programs can also involve the use of peer advisors. Peer advisors can be upperclassmen with excellent GPAs and positive attitudes who can offer support (e.g., tutoring) for struggling students or addressing issues that may impede student progress.

Many learning management systems (LMS), such as Blackboard and Brightspace, have standard features that facilitate intrusive advising procedures. LMS algorithms allow instructors to identify students who fail to meet course standards and quickly inform the student and advisor through electronic alerts. Intrusive advising techniques could also involve incentives such as financial rewards for attendance or achieving specific academic or professional milestones. This approach is efficient for low-income and first-generation students. Highly tangible rewards presented at pivotal intervals will enhance retention and degree completion goals. Proactive advising foundational tenets can also be applied to undergraduate research goals and to ensure students stay committed to pursuing a STEM graduate degree or pursuing a research career after graduation. Intrusive advising strategies for increasing science process skills and knowledge of scientific methods may involve regular individual and group laboratory meetings, skills assessment monitoring, research goal planning, semester evaluations, and the development of career plans.

4. Conclusion

Intrusive advising is a highly structured process designed to provide students with critical information that may enhance academic success, retention, and career aspirations. Proactive advising requires regular meetings to ensure compliance with specific degree plans and to keep students on the right track. Intrusive advising is also called proactive advising, as this term may be less intimidating for the student and advisor. Intrusive advising protocols dictate that the advisor engages in anticipatory actions instead of waiting for problems to occur. Proactive advising helps students establish relationships with campus services and organizations designed to help students before they need it. This involves early assessment of students' attitudes, behaviors, and skills in the first few weeks of the semester or during pre-semester orientation programs. Following appropriate evaluations and analysis of student data, individual student plans are developed and executed.

Additional social science research studies are needed to address the lack of student perceptions of intrusive advising. Specifically, targeted research investigations may be significant for minority-serving institutions (MSIs) that report lower retention rates than predominantly white institutions (PWIs). Interestingly, minority students who attend PWIs report higher retention levels than minority students attending MSIs, suggesting that retention rates may be directly connected to the institution type. A thorough search for specific institutional factors that facilitate higher retention rates would benefit all institutions struggling to improve student retention statistics. Since STEM programs are typically more rigorous for first-time students, intrusive advising should be conducted at three levels (e.g., course, department, institution). Most institutions of higher learning have a dedicated team of advisors at the campus level that oversee student advising; however, too few universities, particularly MSIs, have a mechanism to engage in intrusive advising at the course level. Faculty members must incorporate intrusive advising strategies for struggling students within the context of the course. STEM departments must also invest resources to address students either individually or in a group setting to provide prescriptive interactions to prevent students from failing or dropping out of school in large numbers. It is important to note that not all students will welcome intrusive advising. The most effective approach is amalgamating all three major advising types, although data suggests that HBCU students are more prone to developmental advising tactics [17].

New research studies are needed to determine the effectiveness of intrusive advising protocols in different environments and contexts to expand the use of this proven technique to improve student outcomes and retention.

Compliance with ethical standards

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