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UNPACKING RELATIONSHIPS

INSTRUCTION AND STUDENT OUTCOMES

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The American Council on Education (ACE) has long worked to improve postsecondary attainment by providing quality assurance of college-level learning outside the classroom, promoting alternative education pathways, and working with institutions to create and implement student-centered, attainment-focused instructional approaches and practices that can lead to improved student outcomes and more timely postsecondary credential completion. Quality instruction is the backbone of the higher education institution, and ACE is invested in researching the connections between more effective pedagogical approaches that lead to improved student outcomes. It is our belief that individuals who embrace the most effective teaching practices are more likely to impact the student experience positively, and lead to improved student retention, persistence, and success.

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EXECUTIVE SUMMARY

What is the relationship between instruction and student outcomes? We know that for students to persist, complete, and achieve success in college, the learning environment matters. Students need to feel integrated into academic and social culture, but integration is not enough. They must be engaged. The more engaged students are in learning environments, the more likely they are to complete, learn, and be satisfied. Further, student beliefs about their academic ability influence their success in education, and faculty interactions sit at the intersection of reinforcing or debunking student beliefs.

Yet, the evidence-based practices that we know impact student outcomes and instruction, while widely documented as effective, are not widely used in practice. While learning is a highly complicated process dependent upon a variety of factors, teaching is an equally complicated activity focused upon creating an environment in which students can and do learn and are able to be successful. This paper explores five areas of intersection between instruction and student outcomes, arguing that what faculty do and how instruction occurs matter, and matter greatly.

- TRANSPARENCY: Students must have a clear understanding of where they are going as well as the criteria by which they will be assessed as to whether they have arrived. Making teaching and learning visible is important for *all* students, especially in the design and presentation of assignments. Students need clear goals in order to understand their progress and remain motivated. Transparent teaching involves making the implicit explicit for students so they understand why they are engaged in certain tasks and what role the course plays in their learning journey.

- PEDAGOGICAL APPROACHES: There are various pedagogical approaches that are linked to enhancing student learning, involvement, and engagement beyond simply making the coherence of the educational experience clear to students. High-impact practices provide one such mechanism, as do personalized instruction, active learning, and others.

- ASSESSMENT: Students need multiple opportunities to practice learning in a variety of situations in order to facilitate the transfer of knowledge. It is not enough to create supportive learning environments that simply assess students at the end without providing feedback along the way. Students can learn through doing the assessment task, built upon high expectations and authentic assignments, constructed in ways that support integration and intentional learning.

- SELF-REGULATION: Students have an active role in their education and are more likely to persist and graduate when actively involved in the educational process. The active participation of students in their own learning is a necessary component of the relationships between instruction and student outcomes. Reflection and self-regulation have the potential to move students from passive to active learners, and deep learning is achieved through reflection as opposed to experience alone.

- ALIGNMENT: Learning environments are successful depending on the degree to which the various elements are aligned, such as content, instructional design, pedagogical approaches, assignments, and evaluative criteria. Alignment provides a means to counteract incoherence and fragmentation of the college experience. Undergraduate students need strategies in place that reverse curricular fragmentation and connect their learning for increased student success.

Student academic achievement, supported by effective teaching practices, is a strong predictor of graduation. How students are engaged, as well as the relationship between student engagement and grades earned, impacts student persistence, retention, and graduation. Instruction sits at the intersection of each and can serve as a positive or negative means to reinforce student opportunities.

To move toward fostering learning as opposed to doing instruction, faculty need to be supported to incorporate more active and student-centered learning methods. Faculty also need to help students make connections between various learning experiences and the end goals of higher education by supporting student-centered learning environments. Instruction matters. And higher education needs to provide support for faculty to help students attain outcomes.

ABSTRACT

What is the relationship between instruction and student outcomes? Instruction is composed of "teachable moments" within a student's educational journey, but which instructional experiences are most effective for which types of students—and under what circumstances for persistence, graduation, and student learning? This paper examines the scholarship of evidence-based practice in areas related to instruction and student outcomes, including transparency of clear expectations, pedagogical approaches, assessment of student learning, self-regulation on the part of students, and alignment of learning experiences. Drawing on cognitive science and related literatures, the analysis seeks to outline relationships between performance expectations and pedagogical approaches that enhance outcome attainment, with an emphasis on assignment and course design to help students attain intended proficiencies through active engagement in learning environments. The paper argues for a mutually shaping relationship between student accomplishment and intentional, scaffolded use of engaging pedagogies such as active, applied, and experiential learning, high-impact practices, reflection, and timely formative feedback.

CONTENTS

INTRODUCTION

What is the relationship between instruction and student outcomes? Instruction is composed of "teachable moments" within a student's educational journey, but which instructional experiences are most effective for which types of students—and under what circumstances for persistence, graduation, and student learning? We know that for students to persist, complete, and be successful, they need to feel integrated into academic and social culture (Astin 1993, Tinto 1975)—the learning environment matters. Literature suggests that if students are more engaged in the learning environment, they are more likely to be satisfied (with engaged students achieving better learning outcomes) (Duzevic 2015). Thus, students who are actively engaged are more satisfied, more likely to complete, and more likely to learn.

We also know that student beliefs about their ability to be successful in higher education influence their actual experience of success within education (Kuh 2003; Rendon 1994). In addition, the use of evidence of student learning to improve overall student success matters in classroom environments (Angelo and Cross 1993; Barr and Tagg 1995). Further, academic achievement, supported by effective teaching practices, is a strong predictor of graduation (Pascarella and Terenzini 2005). Grades earned in college are strongly related to retention, persistence, and graduation, with an upward trend in grades associated with a higher probability of graduation (Adelman 2006). Mayhew and colleagues (2016) argue that "students view their grades as a source of feedback about their learning and 'ability,' so they may choose to switch majors, transfer, or drop out if they come to believe that they are not well-suited for their intended degree" (416). They further argue, from reviewing various studies, that "receiving high-quality instruction appears to contribute to students' retention and graduation" (417), with the integration of various learning experiences, active engagement or involvement on the part of the student, and the quality of learning interaction mattering far more than the quantity (Mayhew et al. 2016). Thus, how students are engaged as well as the relationship between student engagement and grades earned impacts student persistence, retention, and graduation.

There is much that is written and known regarding the impact teachers have on students, yet as Russell Edgerton argued in 1997, pedagogical reform such as problem-based learning or collaborative learning remains marginalized within a dominant model of lecture-based instruction. The evidence-based practices that we know matter to student outcomes and instruction, while widely documented as effective, are not widely used in practice. We also have "evidence that deep learning occurs through integration of new information via the senses, meaning-making processes, idea generation, and action" whereby "deep learning and development requires the full engagement of the whole learner along with all those fostering the intended learning and development" (Bresciani Ludvik 2016, 3). John Hattie (2009) states it well in a synthesis of over 800 studies that "what teachers do matters" (22).

This paper examines the scholarship of evidence-based practice in areas related to instruction and student outcomes, including the transparency of clear expectations, pedagogical approaches, assessment of student learning, self-regulation on the part of students, and alignment of learning experiences. Drawing on cognitive science and related literatures, the analysis seeks to outline relationships between performance expectations and pedagogical approaches that enhance outcome attainment, with an emphasis on assignment and course design to help students attain intended proficiencies through active engagement in learning environments. The paper argues for a mutually shaping relationship between student accomplishment and intentional, scaffolded use of engaging pedagogies such as active, applied, and experiential learning, high-impact practices, reflection, and timely formative feedback.

A NOTE ON LEARNING

Learning is a highly complicated process that depends upon interactions among various individual and environmental factors (Wang, Su, Cheung, Wong, and Kwong 2013). As Lave (2011) argues, only learners can learn. Teachers cannot do it for them or make students learn, making teaching a complicated activity focused upon creating an environment in which students can and do learn. But what are the instructional practices that support and engage students, and how can students support their own learning? Barr and Tagg (1995) argue for a shift from a college or university as an institution existing to provide instruction to one that serves to produce learning, for every student, by whatever means work best. But what is learning? James Zull (2011) and John Kihlstrom (2014) argue that learning occurs when there is a significant change in a student as a result of experience within a social context, and that in order to produce such change, we need to better understand how the brain processes information and the theories of learning behind our actions. As John Hattie (2009) argues,

> The act of teaching requires deliberate interventions to ensure that there is cognitive change in the student: thus the key ingredients are awareness of the learning intentions, knowing when a student is successful in attaining those intentions, having sufficient understanding of the student's understanding as he or she comes to the task, and knowing enough about the content to provide meaningful and challenging experiences in some sort of progressive development. (23)

Pulling from ideas behind constructivist theories of learning where knowledge is understood as a construct created within peoples' minds, M. Gail Jones and Laura Brader-Araje (2002) write, "constructivists shift the focus from knowledge as a product to knowledge as a process" where knowledge is always created, not found or retrieved. Thus teaching becomes a process of co-constructing understanding—one in which our desired ends must be clear as well as the means by which we aim to get students to the desired ends through building learning experiences over time.

TRANSPARENCY

Transparency is based upon the idea that students must have a clear understanding of where they are going as well as the criteria by which they will be assessed as to whether they have arrived. (Frederiksen and Collins 1989). Making teaching and learning visible is important for all students, especially in the design and presentation of assignments (Winkelmes et al. 2016).[1] John Hattie (2009) further argues that "teaching must be visible to the student and learning must be visible to the teacher" (25). Making connections between teaching and learning visible is important; John Tagg (2008) claims that there is a clear consensus that institutions are not able to coherently describe their learning goals for students let alone indicate that students have actually learned, making success difficult to define for students. Content analysis of studies conducted over the last 24 years identified communication as one of seven types of integral interventions for use with first-year students to enhance retention and persistence (Morreale, Staley, and Campbell 2015). Moreover, the connection between quality learning and per-

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[1]   For more information on a project focused on transparency, see http://www.unlv.edu/provost/transparency.

sistence is visible through linking clear learning goals to students and their progress toward completion (Humphreys 2016). In other words, students need clear goals in order to understand their progress and to maintain motivation to stay engaged to reach intended goals.

Transparency is based upon the idea that students must have a clear understanding of where they are going as well as the criteria by which they will be assessed as to whether they have arrived.

Photo courtesy of ACE member institution Augustana College (IL).

In an IT business analyst course, transparency was put into action based on the premise that students would take responsibility for their learning if they understood what they were intended to learn. Hill (2009) writes that "an unexpected outcome for the teaching staff was that the process of presenting this information to the students raised our awareness of the relevance of the task." Further, the relationship between communication of the intended learning outcomes together with the intentions of the teacher, supported by assessment activities, led to increased student learning—an enhancement attributed to the improved communication of the intended learning outcome to the students. Hill (2009) concludes that students need to be aware of how they learn, why they need to learn, and how the experience of instruction is connected to their learning. The communication of learning outcomes also had implications for pedagogical approaches, with faculty engaging in less prescriptive teaching and providing more room for emergent learning. In many ways, transparent teaching involves making the implicit explicit for students so they understand why they are engaged in the tasks and what role the course plays in their learning journey.

PEDAGOGICAL APPROACHES

There are various pedagogical approaches that are linked to enhancing student learning, involvement, and engagement beyond simply making the coherence of experience clear to students. Russell Edgerton (1997) identified "four strands of pedagogical reform" that have transformative potential, including problem-based learning (Barrows 1996), collaborative learning (Kaufer 2011), service learning, and undergraduate research. We know that these and other approaches such as experiential learning (Kolb 1984), flipped classrooms (Bergmann and Sams 2012), and inquiry-based learning (Bruner 1961) help to facilitate student engagement and learning—two elements linked to increased retention and persistence. Further, there is research on the relationship of high-impact practices to learning (Brownwell and Swaner 2010; Kuh 2008) and how learning works in postsecondary environments to foster student success (Ambrose et al. 2010). Specific to high-impact practices, Kuh (2008) examined various teaching and learning practices building upon decades of research that indicated student development "is a cumulative process shaped by many events and experiences, inside and outside the classroom" (13), but that there were some processes that when done well, engaged students in ways that enhanced persistence. These high-impact practices such as first-year seminars and experiences, common intellectual experiences, learning communities, writing-intensive courses, collaborative assignments and projects, undergraduate research, diversity/global learning, service/community-based learning, internships, and capstone courses and projects engaged students in ways that led to deeper learning. Deep learning matters because students who participate in such activities tend to earn higher grades and transfer information at higher rates. Earning higher grades is positively related to persistence and completion. Further, underserved students benefit more from engaging in purposeful activities, such as high-impact practices (Kuh 2008), providing a means by which to close achievement gaps.

Karen Singer-Freeman and Linda Bastone (2016) put various principles and theories of supportive learning into practice with a larger introductory general education course. Their efforts to intentionally use evidence-based pedagogical practices through discussion sections, active learning, and varied approaches to assessment led to increased learning and retention for underserved students in the course. Further, large introductory science courses have shifted from lecture-based teaching to student-centered pedagogy at scale in junior-level courses (Pollock 2014). Further, a study on the relationship between a teacher's approach to teaching and approaches to learning by the students in the class found that how teachers taught impacted whether students' learning occurred at a surface level or a deeper level, with more student-oriented approaches to teaching leading to deeper learning for students (Trigwell, Prosser, and Waterhouse 1999). Tanner (2012) argues that effective teachers need to continually ask, "What assumptions do I hold about students? To what extent do I have evidence for those assumptions? Why do I make the instructional decisions that I make?" (118) leading to intentional teaching on the part of faculty to meet students where they are and support them on their way to where they need to go.

Yet, it is not enough to simply teach students material; they need multiple opportunities to practice learning in a variety of situations in order to facilitate the transfer of knowledge (Shepard 2000). Transfer of knowledge is critically important for learners to realize that something they learned in a specific

There are various **pedagogical approaches** that are linked to enhancing student learning, involvement, and engagement beyond simply making the coherence of the educational experience clear to students.

Photo courtesy of ACE member institution Ohio Dominican University.

course has application in another. One approach that may be useful to facilitate student-centered learning focused on transfer is mastery learning or personalized systems of instruction. Personalized instruction has roots in behaviorist psychology and builds upon the idea that students are not able to advance until they have mastered prior areas of learning. The assumption is that every student can master the material, and will, if given the right opportunities and support. Meta-analyses of studies of the personalized system of instruction, reviewed by Pascarella and Terenzini (1991, 2005), indicated that personalized instruction was much more effective than traditional methods—the difference amounting to effect sizes of .40 or greater. Upon mastery of material in a specific context or course, students are then tasked with applying their knowledge and skills in various situations through assessment of their learning.

ASSESSMENT

Pellegrino, Chudowsky, and Glaser (2001) argue that in an authentic learning environment, "assessment is based upon observations of student engagement and analysis of artefacts produced in the process of completing the tasks," (304) meaning it is inherently embedded in teaching and learning. Yet, Bain (2004) argues that few professors intentionally design their assessments as a possible "powerful aspect of education that can have an enormous influence on the entire enterprise of helping and encouraging students to learn" (300). Bain's argument is in close agreement with Norton (2004), who states that one of the "most powerful roles that assessment can have, [is] its effect not only on what

Students can learn through doing the **assessment** task, built upon high expectations and authentic assignments, constructed in ways that support integration and intentional learning.

Photo courtesy of ACE member institution The College of Saint Rose (NY).

students learn but *how* they learn" (687). Students can learn through doing the assessment task when it is constructed in a way that supports integration and intentional learning. As Norton (2004) states,

> Unfortunately, all too often undergraduate essays still ask students to 'describe', 'compare and contrast', 'outline', and so on. Such instructions rarely help students to engage with the material in any meaningful way. Students are likely to perceive such assignments as artificial hurdles to get over in their quest for a degree...many students treat the coursework essay as a task which is unrelated to the actual learning process. In such instances, it is likely that the assessment system is not aligned with the learning objectives as students are concentrating on the superficial and trivial. (688)

A focus on authentic assignments has been presented as a mechanism to counter disconnected assessment efforts and reinforce the shift to producing learning (Huba and Freed 2000). Steiner (2016) defines authentic assignments as assignments that are "carefully designed by the instructor to mirror the types of tasks students will encounter in a real setting. They require problem-solving, creativity, and application" (272). They also build from student interests, require reflection, and allow students multiple opportunities to practice their knowledge and skills. The importance of practicing knowledge and skills in multiple environments across a curriculum is echoed in the lessons learned in writing across the curriculum, as Melzer (2014) outlines, and in meaningful assessment practices such as aligned learning experiences and integrated and embedded assignments (National Institute for Learning Outcomes Assessment 2016).

David Eubanks and David Gliem (2015) discuss the mechanisms of incorporating examples of authentic student work into externally facing mediums such as portfolios. Providing a mechanism by which students can showcase multiple approaches to their learning matters, because what works for one student population may not necessarily work for another (Ajinkya, Brabender, Chen, and Moreland 2015). E-portfolios have been shown to improve learning for students, faculty members, programs, and institutions using the design principles of inquiry, reflection, and integration (Eynon, Gambino, and Török 2014).[2] Helen Chen and Tracy Penny Light (2010) provide an overview of electronic portfolios and ways individuals and campuses can implement e-portfolios to enhance and assess student learning, recognizing that learning occurs in many places, takes many forms, and is exhibited through many modes. Portfolios have also been used in capstone experiences allowing for students to demonstrate a range of knowledge and skills (Murray, Perez, and Guimaraes 2008) through integration (Schermer and Gray 2012).

Finally, it is not enough to create supportive learning environments to simply assess students at the end without any feedback. For maximum effectiveness in enhancing learning, formative assessment should be intentionally designed into instruction from the start rather than being an add-on later or for reporting or compliance purposes. In a study of student reactions for formative and summative assessment approaches, students in physics courses preferred the formative system, offering reasons such as meaningful feedback, chances to improve, and less pressure overall (Plybour 2015). The importance of feedback to enhance learning as well as increase retention and persistence is indicated in a research review of articles from 2000 to 2012 by Evans (2012). Evans found that students receive feedback from multiple sources, with feedback being connected to facilitating students as self-regulated learners—yet not all feedback is created equal. Evans presents four types of feedback: task feedback, which emphasizes clarifying and reinforcing aspects of specific learning tasks; process feedback, focusing on what students need to do to move forward with their tasks; self-regulation feedback, which focuses on helping students monitor and evaluate strategies used; and self-feedback, focusing upon how well students have done. While there are many studies that point to the important role played by feedback to promote student learning and engagement, feedback alone will not improve outcomes. Students need opportunities to use the feedback, to engage in tasks and assignments in different settings that employ the feedback, and time for making sense of the feedback (Evans 2012). They need to learn to regulate their learning to be successful throughout their educational journey.

SELF-REGULATION

Students are more likely to persist and graduate when actively involved in the educational process. Donna Wilson and Marcus Conyers (2013) outline five ideas from cognitive science research that are applicable to teaching and learning, one of which focuses upon the role of metacognition and reflection to enhance students' active engagement in their own learning. The principles of active reflection on the part of students and engagement into metacognition are demonstrated in different disciplines

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2   For additional information on the utility of portfolios see e-portfolios for reflection, learning, and assessment, the 2014 edition of *Peer Review,* 16 (1).

by Kaplan, Silver, LaVaque-Manty, and Meizlish (2013), underscoring the importance of students' ability to monitor and reflect on their own learning. Yet, the majority of students are not prepared to manage their own learning or to be self-regulated learners when left to their own devices. Reflection and self-regulation have the potential to move students from passive to active learners (Boekaerts 1999). Deep learning is achieved through reflection as opposed to experience alone (Ash and Clayton 2008), making the active participation of students in their own learning a necessary component of the interaction between instruction and student outcomes.

Metacognition refers to the knowledge of one's own cognitive processes—being aware of how one learns and understanding which strategies will support academic success. Tanner (2012) argues that small changes can help students with metacognition such as adding reflection into existing course-work by asking what was most challenging about the assignment or what questions arose in completing it that students had not considered before. Further, faculty can share how they think through a concept or approach to solving a problem (Tanner 2012), making explicit for students their internal thought process.

In an effort to develop an assignment through which students could practice self-regulated learning strategies, Steiner (2016) asked students to actively practice and reflect upon self-regulated learning strategies. Teaching students how to be mindful is important because the majority of students engage in study approaches that are not beneficial, such as highlighting, rereading, and summarization (Dun-

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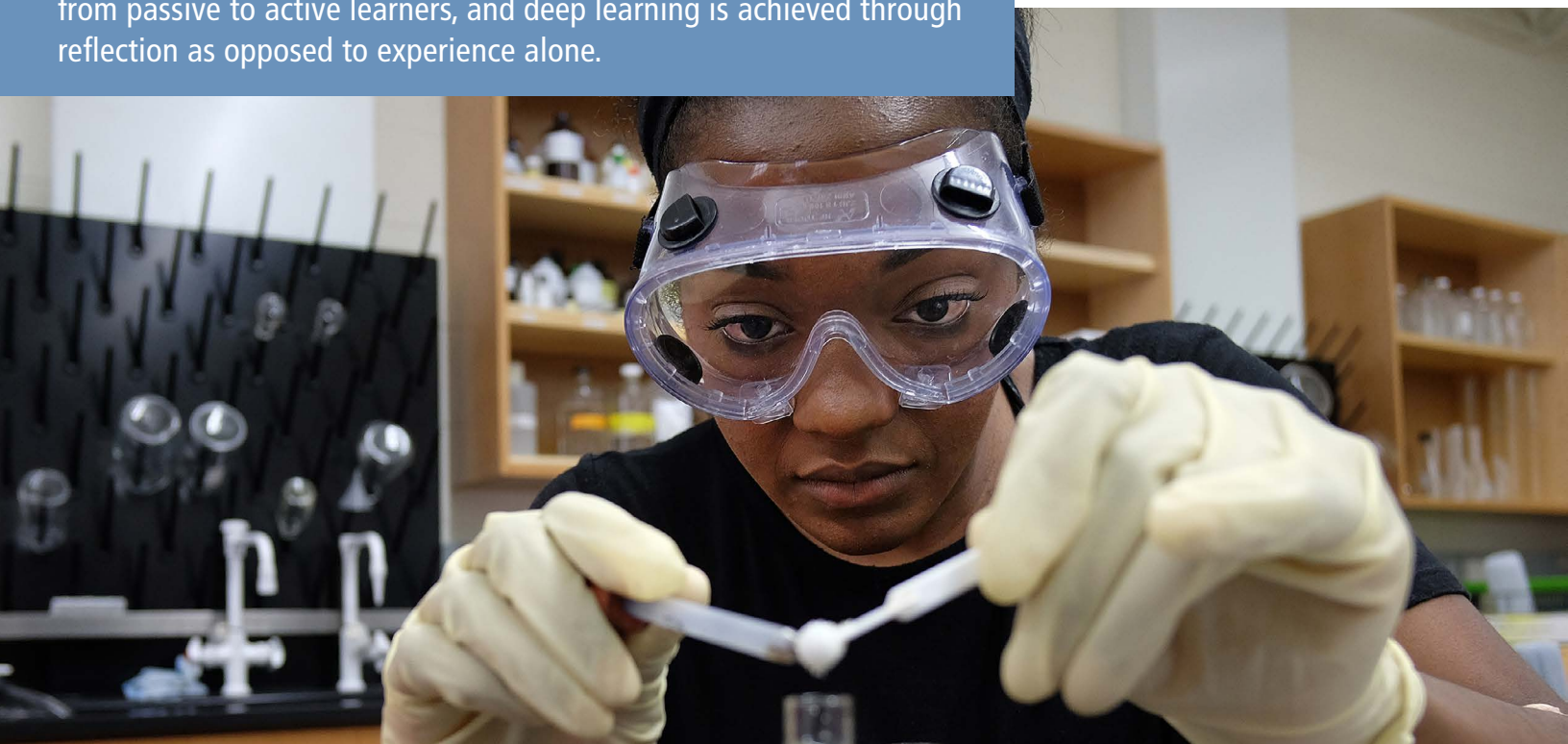
Photo courtesy of ACE member institution Mary Baldwin (VA).

losky, Rawson, Marsh, Nathan, and Willingham 2013), leading to disengagement and disenchantment with the educational process. What is needed is the means for students to develop strategies to guide their own learning. In Steiner's (2016) assignment, students learned study strategies, time management, and communication in the process of preparing for an actual test in a course of their choosing. The approach allowed students to be aware of their options and know when to use different ones while avoiding ineffective strategies. At the completion of the assignment, students had identified which approaches worked for them, reflected upon why they worked, and saw an increase in their test scores from using the self-regulation strategies. Self-regulation approaches allow for the creation of a coherent educational environment focused on alignment.

ALIGNMENT

Learning environments are successful depending on the degree to which various elements, such as content, instructional design, and assignments, are aligned (Reeves 2006). Wiggins and McTighe (2005) argue that learning is enhanced when experiences are intentionally and thoughtfully designed, where curriculum is planned backward from the desired learning outcomes, and students clearly see how the various pieces fit together along the way to help get them there. Pat Hutchings (2016) presents alignment as the linking of intended student learning outcomes with the processes and practices needed to foster those outcomes or scaffold student learning. Alignment is also a mechanism by which to counteract incoherence and fragmentation of the college experience. Ash and Clayton (2008) argue that intentional design work integrates critical reflection into the core of learning experiences, thus reinforcing active reflection on the part of students. Thinking about instruction as an alignment mechanism provides a means to bring the various components of transparent outcomes, pedagogical approaches, assessment, and student reflection together into a coherent whole. Creating coherence and intentionality is important because one of the greatest challenges in higher education is "to foster students' abilities to integrate their learning across contexts and over time. . . . The bad news is . . . the very structures of academic life encourage students to see their courses as isolated requirements to complete" (Huber and Hutchings 2004, 1). Undergraduate students need strategies in place that reverse curricular fragmentation and connect their learning to increase student success.

A focus on intentional alignment is beneficial to student outcome attainment, as demonstrated by Wang, Su, Cheung, Wong, and Kwong (2013), who found that students in more constructively aligned courses were more likely to adopt deeper approaches to learning and less likely to use surface learning approaches in their course work. Teater (2011) found increased successful student learning in social work undergraduate courses by revising learning outcomes, determining aligned teaching methods and learning activities, designing assessments in relation to the prior elements, and providing regular feedback actively involving students in their learning. Teater further found that students needed to learn by doing by engaging with the course material and participating in activities to practice applying the material to various situations. In an attempt to intentionally integrate and align general education with the major and electives, faculty at Wheaton College (IL) found through the process that "our campus has frequently presumed that learning occurs only in classrooms under the guidance of faculty members, often ignoring the contributions of staff who support students in co-curricular and applied

settings" (Eisenmann, Brumberg-Kraus, Gavigan, and Morgan 2014, 17–18). Further, others who have engaged in alignment exercises have found that "integrative learning is as much about pedagogy as about curriculum, as much about the culture of learning and collegiality as about specific programs" (Newman, Carpenter, Grawe, and Jaret-McKinstry 2014, 15). It is also about being aware and supportive of the various places where students learn. For instance, **WiGrow**[3] and **Iowa Grow**[4] support students through active engagement in seamless learning environments by engaging student affairs offices—a

Alignment provides a means to counteract incoherence and fragmentation of the college experience

Photo courtesy of ACE member institution Tufts University (VA).

large employer of students—in fostering student connections between classroom and out-of-class experience through reflection in their on-campus employment. Supervisors received training and had two structured conversations with each student employee throughout a semester, facilitating connections between student employment and coursework. They found that students were more likely to see connections between their work and classroom when actively engaged in conversations on the relationship between the two. Alignment and ongoing discussion around where learning happens is important

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3   More information about WiGrow is available on its website: **https://www.ohrd.wisc.edu/home/Hide-A-Tab/ WiGrow/tabid/418/Default.aspx.**

4   More information about Iowa Grow is available on its website: **https://vp.studentlife.uiowa.edu/initiatives/ grow/**.

to foster active engagement on the part of students and increase persistence, retention, and success. Newman and colleagues (2014) argue that

> The intellectual skills at the heart of a liberal arts education must be developed in, and then applied across, multiple contexts – in different courses, in a variety of disciplines, using a range of modalities. Just as students do not learn to become effective writers by taking a single "first-year comp" course, they will not learn to be numerically, visually, and culturally proficient unless these skills are modeled and reinforced throughout the curriculum. Students will not really appreciate the power of quantitative reasoning if they think it only matters in their math classes; so too, if they think visual learning is only for the artistically inclined... these exercises in integrative learning encourage students to reflect on how and why they should learn these skills, as well as how they might apply them in novel contexts. (14)

CONCLUSION

Looking across the range of issues presented in this paper, the environment that fosters engagement, support, and learning matters for retention, persistence, and completion. Instruction sits at the intersection of each and can serve as a positive or negative means to reinforce student opportunities. From C. Carney Strange and James H. Banning (2015) we know that environments matter for fostering student success. The elements that matter most in the environment are the student, teacher, teaching approaches, curriculum, institution, and factors going on outside of those contexts in which the student lives (Hattie 2009). Environments matter, but so do prior experiences. Ernst Von Glasersfeld (2005) states that

> Too often teaching strategies and procedures seem to spring from the same naïve assumption that what we ourselves perceive and infer from our perceptions is there, ready-made, for the students to pick up, if only they had the will to do so. This overlooks the basic point that the way we segment the flow of our experience, and the way we relate the pieces we have isolated, is and necessarily remains an essentially subjective matter. (5)

If we are to move, as Barr and Tagg (1995) suggest, to a learning paradigm with an emphasis on supporting learning as opposed to doing instruction, then faculty need to incorporate more active and student-centered learning methods into courses and learning experiences (Goldberg 2012).[5] Faculty also need to help students make connections between the various experiences and the end goals of higher education.

A constructivist theory argues that knowledge is a construct that is created, environments are central to the process of creating knowledge, and the teacher-student relationship within these environments requires a mutual relationship of sharing and discussing. Faculty and students need to make meaning together on what it means to learn, what success looks like, and how each is responsible to move the other toward success. We know that those doing the teaching need to have an understanding of the material to be taught and to organize and present it in a way such that students are able to achieve mastery (Pascarella et al. 2008). In other words, we need a student-centered learning environment.

Student-centered learning environments provide interactive, complementary activities for individuals to address unique learning interests and needs, study multiple levels of complexity, and deepen understanding. Such environments facilitate student- or self-directed learning by enabling students to productively engage complex, open-ended problems that are aligned authentically with the practices, culture, or processes of a specific discipline (Land, Hannafin, and Oliver 2012). Cook-Sather, Bovill, and Felten (2014) define student-faculty partnership "as a collaborative, reciprocal process through which all participants have the opportunity to contribute equally, although not necessarily in the same ways, to curricular or pedagogical conceptualization, decision-making, implementation, investigation, or analysis" (6–7). In contrast to faculty as knowledge brokers or gatekeepers, students and faculty are seen as partners in learning and teaching, or as a community of learners that is culturally validating and affirming, providing students with a curriculum that builds from their prior knowledge and experiences to enhance academic success (Coffey 2008).

Student success and instruction are necessarily in a mutually shaping relationship where each can support and bolster the other. As Hattie (2009) states, "what teachers do matters," and higher education needs to provide the support for faculty to undertake such tasks.

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5   For a focus on motivational principles for teachers to engage students in learning, see Brophy (2010).

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