

## **The Value of Intensive, Compressed, Immersion-Learning in Science: An Academic Overview of the Integrated Science Program (ISP)**

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Adult learners have become the majority in university campuses throughout the United States since the early 1990's. According to the Chronicle of Higher Education (1994), 57% of all college students enrolled in the Fall of 1992 were beyond the age of 22, the cutoff age to be considered an adult learner. Lately we have seen an increase in this trend, since more and more adults are seeking a career change, notably towards professions in the health sciences, which most often requires them to return to school. This new demographic has challenged colleges and universities to offer flexible programs that match the needs of adult students who must balance professional development with work and family responsibilities (Wlodkowski, Mauldin, & Gahn, 2001; Icaza, Heredia, & Borch, 2005). Kazis et al. (2007) state that “traditional higher education programs and policies—created in an era when the 18- to 22-year-old, dependent, full-time student coming right out of high school was seen as the core market for higher education—are not well-designed for the needs of adult learners, most of whom are ‘employees who study’ rather than ‘students who work’” (p. 1). In this sense, weekend classes offered in an accelerated learning format which meet the required contact hours (but over a shorter duration of time) may appeal to adult learners who cannot take time away from their employment or family matters during weekdays (Tan, 1996). Accelerated learning formats may provide the opportunity for adult learners to be academically successful while still balancing their other responsibilities (Wlodkowski & Kasworm, 2003).

Wlodkowski, Mauldin, & Gahn (2001) indicate that “more than 190 traditional institutions in the U.S. have developed flexible programs with accelerated formats, evening and weekend courses, and distance or on-line options specifically to serve the working adult student

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(p.1).” The University of Oklahoma in Norman has offered since the early 1990’s different options to meet the needs of its adult learners, among them weekend classes. Such classes generally meet for half a day on Fridays, all day on Saturdays, and half a day on Sundays over a three-week period. The number of student contact hours is the same as any three-credit-hour semester-long course on campus (Tan, 1996).

The Integrated Science Program (ISP), offered at Southern California University of Health Sciences in Whittier, California, is an example of an academically rigorous, yet flexible program with an accelerated, intensive format designed to help working adults complete their science prerequisites in a shorter period of time. The program cultivates critical thinking and scientific reasoning through focused study of basic college level science in an intensive, immersion-learning format in a collaborative learning environment that fosters sharing of knowledge among students and faculty. ISP is committed to provide students with: 1) a solid foundation in basic sciences, from which they can successfully pursue further studies in the biological or healing arts and sciences, 2) the skills to become free-thinking participants in the world, and 3) the ability to substantively integrate knowledge of basic science both within and across disciplines.

The average age of students registered at the Integrated Science Program during the 2008 – 2009 academic year (N=157) is 31 years, with a median of 28 years. The majority of them (58.6%) are female. They are typical working adults who are returning to college in search of career change, seeking the acquisition of new knowledge in basic sciences in order to meet the prerequisites for health sciences professions. Students who attend ISP seek to transfer their credits to four-year public and private colleges and universities throughout the United States. These ISP credits are transferable because Southern California University of Health Sciences is accredited by the Western Association of School and Colleges (WASC).

### **The Accelerated Format: Delivery Configuration and Learning Environment**

It is important to consider the accelerated format from two complementary and intertwined perspectives: the delivery configuration and the learning environment. Both aspects,

when harmoniously integrated, may result in a powerful alternative for expediting the academic road for adult learners with easier access, persistence, and success in postsecondary education.

From the delivery configuration perspective, accelerated is synonymous with compressed, meaning to shorten the time-length necessary for completion of a particular course or program of study while keeping the same number of contact credit hours as in any traditional, semester-long equivalent course or program. As a result, time-intensiveness and immersion are its distinctive features. Accelerated delivery configuration is relevant as an alternative to increase accessibility of adult workers to postsecondary education, and more accelerated learning options are needed for adult learners (Kazis et al., 2007). Choitz & Prince (2008) support the importance of accelerated delivery configuration as a critical alternative to promote accessibility for adult learners to postsecondary education, recognizing time inflexibility as a major barrier to their success in traditional program and course designs:

Adults need a range of flexible design and delivery options that recognize the time constraints facing people who work, have family responsibilities and are trying to upgrade their skills to be more competitive in the labor market and improve their standard of living. Such designs are emerging and maturing across the country ... Yet, the development, expansion, and diffusion of these options ... have been slow and isolated in particular pockets of creativity (p. 3).

The possibility to integrate the knowledge of basic sciences in a functional whole for adult learners is much more likely in an intensive, accelerated program that is organized in a block format with the disciplines ordered and taught according to a hierarchy of matter that research in science has advanced and verified. This is the way in which the Integrated Science Program operates. Students are intensively immersed in one subject at a time and, thanks to the compressed format, are able to easily remember the first concepts learned in the discipline while studying the final ones. Such characteristics set the stage for substantial integration of knowledge of basic sciences both within and across disciplines.

Where and when classes are available becomes critically important criteria for adult workers to decide where to enroll (Kazis et al., 2007). The Integrated Science Program's delivery configuration, congruent with research recommendations (Choitz & Prince, 2008; Kazis et al.,

2007; Wlodkowski & Kasworm, 2003; Wlodkowski, Mauldin, & Gahn, 2001; Tan, 1996), creatively provides the flexibility for adult workers to access postsecondary education while keeping their work and family responsibilities. The program provides options to continuing students that are not available in the California state college and university systems. ISP courses are offered on a face-to-face weekend-based delivery configuration, in which each weekend corresponds to one semester-unit credit. Each portion of a course meets during four consecutive weekends, and altogether is worth four semester-unit credits. Final exams for each portion of a course take place in a 3-hour meeting on the Wednesday following the last weekend of class. The portfolio of courses includes Anatomy and Physiology (portions 1 and 2), Biochemistry, General Chemistry (portions 1 and 2), Human Biology (portions 1 and 2), Microbiology, Organic Chemistry (portions 1 and 2), and Physics (portions 1 and 2).

Profiles of ISP students have shown that many of them come to the program from professional fields that require no academic background in mathematics. This has been a major barrier to student success in General Chemistry and Physics courses, as well as a major challenge for General Chemistry and Physics instructors. In order to address this issue ISP offers a pre-calculus course as a co-requisite for General Chemistry and Physics, designed to provide students who are registering for General Chemistry and Physics with the quantitative, pre-calculus tools, to help them better succeed in these courses. The pre-calculus course is a two semester-unit credit course that meets during eight consecutive Fridays starting the Friday immediately before the start of General Chemistry 1. All prospective General Chemistry and Physics students are required to sit for a mandatory placement test in math; those who perform sixty percent or less in the test are required to take the pre-calculus course as a co-requisite for both General Chemistry and Physics.

Recent research supports that the quality of learning and the attitudes of students in accelerated programs are similar or superior to those in traditional programs (Wlodkowski, Mauldin, & Gahn, 2001). In a comparative study of students enrolled in the same course with two different formats (semester-long vs. condensed) at the University of Oklahoma, Tan (1996) found no significant difference in academic performance between students enrolled in both formats. According to him, the findings of his study should be regarded as an encouragement to

many institutions of higher education contemplating adding innovations to their course formatting. The study's evidence shows that courses do not need to run a full term since condensed courses can be just as effective in bringing out desired student outcomes as semester-long ones (Tan, 1996). A two-year collaborative study conducted by Regis University and the University of Missouri at Kansas City, reported by Wlodkowski, Mauldin, & Gahn (2001), found that previous learning experience at the postsecondary level is beneficial for persistence and success of adults who enter four-year colleges whether they are in accelerated or traditional programs.

Providing that the accelerated delivery format constitutes an important alternative to facilitate access to postsecondary education for adult workers, a proper learning environment is key to enhance their possibilities of persistence and success. ISP learning environments are heavily grounded in the "andragogical" (learner-centered) model originally developed by Knowles (1984), based on the following assumptions (Imel, 1989): 1) Adults tend to be self-directing; 2) Adults have a rich reservoir of experience that can serve as a resource for learning; 3) Adults tend to have a life-, task-, or problem-centered orientation to learning instead of a subject-matter orientation; 4) Adults are generally motivated to learn due to internal or intrinsic factors as opposed to external or extrinsic forces.

Intrinsic motivation to learn is a central element to be acknowledged upfront when dealing with adult learners such as ISP students, in order to establish a learning environment that not only recognizes but also expands such motivation as the class advances. In other words, we must keep in mind that adult learners are in the classroom because they want to be, usually seeking out learning experiences in order to cope with specific life-changing events. Learning, for them, is a means to an end, not an end in itself. Research has indicated that intrinsic motivation to learn is fostered by a teacher's explicit enthusiasm toward the subject during lectures and laboratory sessions (Patrick, Hisley, & Kempler, 2000).

When selecting teachers for ISP, being a science practitioner is a leading requirement along with the candidate's teaching philosophy and experience. To face the challenges that an intensive, compressed format poses to both students and teachers (time-intensiveness and immersion learning), the program always looks for enthusiastic and experienced teachers who

are creative and are able to apply multiple teaching methods in the classroom as a way to engage as many students with different learning styles as possible in the learning process. The goal is to have teachers that, besides and above their academic credentials, are able to create a learning environment that is psychologically comfortable. A psychologically comfortable learning environment is one that fosters motivation to learn and encourages self-instruction, communication, problem-solving, team-work, and creative thinking.

Teaching method is another variable of paramount importance when considering an intensive, compressed, immersion-learning program in science, such as the Integrated Science Program. The Council on Adult and Experiential Learning (2005) recommends the use of adult-focused teaching methods to improve both persistence and success for adults in postsecondary education. The council specifically emphasizes the need for multiple methods of instruction for adult learners in order to connect curricular concepts to useful knowledge and skills. Kazis et al. (2007) found that many innovative programs in two- and four-year colleges rely on instructors who are also practitioners and have experience in their field, as a way to facilitate the use of multiple teaching methods in the classroom. This is exactly what ISP prioritizes within the process of teacher recruitment.

The multiplicity of teaching methods in an intensive, compressed immersion-learning program must address the visual, auditory, and kinesthetic learning styles, not losing track of connecting curricular concepts to useful knowledge and skills. Experiential and problem-based methods are particularly important in such an environment. Any activity that gets students involved makes the learning experiential: small group discussions, experiments, role-playing, group writing and problem-solving, etc. Socratic questions are of particular usefulness: the purpose is to challenge accuracy and completeness of thinking and strengthen the possibility to integrate knowledge both within and across disciplines. Through Socratic questions, the teacher can clarify concepts, probe assumptions, rationale, reasons and evidences, implications and consequences, as well as question viewpoints and perspectives.

The main challenge posed by an intensive, compressed, immersion-learning program in science such as the Integrated Science Program is to create and maintain a learning environment that is responsive to its delivery configuration. Science practitioners who are enthusiastic

teachers are at the core for the success of the program, providing the students with an outstanding learning experience through a balanced integration between delivery configuration and learning environment.

### **Concluding Remarks**

Accelerated programs, compressed configurations of a particular course or program of study that keeps the same number of contact credit hours as in any traditional, semester-long equivalent course or program while shortening its time-length, are definitely important alternatives to meet the needs of adult workers who must balance professional development with work and family responsibilities. Research findings, as indicated throughout this paper, strongly support such contention. Several studies mentioned in this essay suggest that the quality of learning and the attitudes of students in compressed courses are similar to those in traditional, semester-long courses.

The main challenge is to create and maintain a learning environment that is appropriated to the students' profiles (adult learners) while responsive to the challenges of time-intensiveness and immersion, distinctive features of the accelerated delivery format. A balance between the delivery configuration and the learning environment is the defining attribute to effectively promote access, persistence, and success of adult learners in accelerated programs in postsecondary education. A learner-centered pedagogy (andragogy) that relies in multiple teaching methods conveyed by enthusiastic, experienced, and creative teachers that are able to engage as many students with different learning styles as possible in the learning process, is the driving force to keep students' intrinsic motivation to learn. The Integrated Science Program is organized and implemented with a combination of approaches, both in its delivery format and educational philosophy, that optimizes flexibility, access, persistence, and success for working adults in postsecondary education.

Finally, the literature points to a significant barrier faced by adult learners towards completion of their postsecondary education: credits earned by adult workers in accelerated programs are sometimes rejected by traditional private and public non-profit institutions. Kazis

et al. (2007), reporting to the U.S. Department of Labor, refer to the poor alignment between learning institutions and systems in terms of credit transferability as exacerbating the inflexibility that constrains adult students. According to them, “for adult learners, the disconnects between institutions in a given education sector – and across sectors – can be the toughest obstacle to overcome and the most deflating aspect of trying to advance educationally and economically” (p. 23). Kazis et al. (2007) go further in the issue recommending institutions of higher education to address the lack of alignment to smooth and speedy student progress. They specifically mention, as a key strategy, to “negotiate articulation agreements among institutions in a region to accept courses in particular programs for credit.... These agreements can be important tools in helping students get the most out of courses they have taken at different institutions” (p. 23). It is strongly recommended that Southern California University of Health Sciences actively pursue articulation agreements with public and private institutions and systems towards the acceptance of the credits of the Integrated Science Program.

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