

LEARNING OUTCOMES AND SELF-ASSESSMENTS OF BACCALAUREATE STUDENTS

IN AN INTRODUCTION TO NURSING COURSE

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ABSTRACT

This study investigated how students (N=64) assessed the process and meaning of their learning of course competencies, using critical reflective inquiry. At the conclusion of an introduction to nursing course, beginning students were asked to reflect upon what and how they had learned, to consider what course competencies they had met, and to identify the learning experiences that facilitated them. Written responses were categorized and coded by course competencies using the selective coding method, and then ranked for degree of self-assessment (SACD). A significant relationship was found between final grade in the course and SACD ($r=.676$, $p \leq .000$), as well as GPA at beginning of junior year ($r=.420$, $p \leq .037$). This study of student reflexive practice contributes to an understanding of the process of competency development in nursing students as they progress from novices to competent generalists

Learning outcomes and self-assessments of Baccalaureate students
in an Introduction to Nursing course

Expertise arises from constant examination and analysis of performance through active purposeful reflection (Andrews, 1996, p. 513).

INTRODUCTION

Expertise is a prized attribute in nurses that is developed over time and practice, and cannot be taught in one classroom. It is the culminating step in the ongoing evolution of a nursing student from beginner to expert clinician. Nursing education has as its goal the creation of competent providers of basic nursing care, and is also concerned with this evolution of the novice nursing student into a competent generalist by graduation, and ultimately an expert nurse. An attribute of an expert nurse is one who uses mindful practice to reflect upon one's skilled nursing care practices, decisions made and patient-family-health care team interactions (Benner, 1982; Epstein, 1999). Mindful practice is a reflective experience that transforms immediate experience through its automatic cognitive processing (King & Hibbison, 2000).

One learning strategy that can be used by educators to support the development of mindful practice in students is reflexive practice, which provides opportunities for critical reflexion on events, interactions, choices made and outcomes of one's choices through the use of diaries, journals, class and small-group discussion, and other critical reflection exercises (Brookfield, 1995). Little is known, however, about how these reflexive practice activities are associated with nursing students' learning processes as they progress from novices to competent generalists, and then to experts in nursing care. Specifically, little is known about how beginning nursing students evaluate their own learning of the competencies that demonstrate their understanding and

application of course content, and how this self-evaluation relates to their success in each course and in their academic program.

The purpose of this non-experimental field study is to investigate how students in a beginning nursing course self-assess their learning of course competencies without prodding or cueing, using the process of critical reflective inquiry. Naturalistic inquiry was the method used to investigate this process of academic development. Naturalistic inquiry is a process of observation and questioning that attempts to not disturb or manipulate the naturally occurring phenomenon under study (Streubert & Carpenter, 1995). The phenomenon under study was: (1) the degree of mindfulness that students displayed about their own academic growth, and (2) the ability to link their learning activities to the degree of personal learning they experienced. The primary research question that guides this naturalistic inquiry is: Is ability to critically reflect, demonstrated by richness of recall, description, explanation and insight, associated with other indices of academic success?

Sophomore students in a baccalaureate nursing program at a North American university were the subjects of this study. The independent variable used for general linear model multivariate regression analysis was self-reflection ability as demonstrated through responses to a critical reflective inquiry exercise (Self Assessment Content and Description, or SACD). Contextual variables were: count and richness of description of competencies that each student claimed he/she had learned, high school standardized academic testing (SAT) total score, age and gender of student. The dependent variables were: progression in the program as measured by course final grade, GPA at beginning of junior year, and registration in junior year courses. Results of this study describe the beginning stages of the process by which students become

competent and aware of their competence as providers of basic nursing care. Results also contribute to the body of nursing knowledge about this process of competency development in nursing students as they progress from novices to competent practitioners of general nursing care.

LITERATURE REVIEW

The conceptual framework that guides this study is based upon Pat Benner's (1984) model of skill acquisition as a developmental process in nursing students as they progress from novices to experts (Carlson, Crawford & Contrades, 1989). This model was, in turn, adapted from the Dreyfus model of skill acquisition which postulates that skills are learned and performed in a progressive manner, by which the learner progresses through five stages of proficiency: novice, advanced beginner, competent, proficient and expert (Benner, 1984; Dreyfus & Dreyfus, 1980). The expert is defined as "a reflective practitioner who works intuitively, drawing almost unconsciously on a repertoire of context-specific paradigm cases" (Rolfe, 1997, p. 93). Key to this process is the role of experience as the engine that drives the progression, as nursing students begin to test and refine their hypotheses and skills and challenge their assumptions and expectations. This phenomenon is considered the students' immediate, or primary experience of any event, and it is the transaction between this immediate experience and the students' interpretation of it that generates the learning that occurs (Ryan, 1994).

Reflection has been defined as: "the retrospective contemplation of practice undertaken in order to uncover the knowledge used in a particular situation, by analyzing and interpreting the information recalled" (Fitzgerald, 1994, p.67), or "thinking back about something of interest" (Pierson, 1998, p. 165). The student uses reflection as the primary process that imbues experiences and cognitions with personal meaning. It is this experiencing of an event and its

subsequent interpretation that is termed the “mediate-immediacy” (Ryan, 1994, p. 29) learning that occurs when primary experience together with reflective experience transforms learning through cognitive processing or layering. A goal of nursing education is to produce nurses who engage in this mindful practice.

Nurse educators often use the reflective process to assist students in contemplating and reviewing their actions and then translating the self-knowledge that is produced by that activity into an intuitive grasp of the learning event (Colina & Medina, 1997; Rolfe, 1997). One example of this is the common use of clinical logs or journals requiring students to reflect upon their clinical experiences and then connect them to concepts, information or theories taught in the classroom (Chambers, 1999; Marland & McSherry, 1997). Key to this learning experience is the educator’s provision of sufficient time for students to process their recalled events, and use of questions that facilitate this self-examination, as well as structuring a safe environment in which learning can occur (Billings & Halstead, 1998). Benner’s research uncovers these hidden mental processes of learning (Paley, 1996) that generate perceptual awareness and a growing competency in the nursing student (Benner, 1982; Carlson, Crawford & Contrades, 1989). This growing demonstration of a perceptual awareness by the student can be described as working from an intuitive base (English, 1993), or an “understanding without rationale” (Benner & Tanner, 1987, p. 23). This intuitive practice is based upon an ability to recognize relationships between and among events and responses (Benner & Tanner, 1987). It can be taught by helping students to focus on the whole event, or Gestalt, and using feedback gained from reflection to review the accuracy of their assessments and clinical judgments. This process is termed reflexive practice (Colina & Medina, 1997).

Reflexive practice can be taught through the use of the twin processes of reflective inquiry and critical reflective inquiry. Reflective inquiry uses controlled and directive reflection to analyze an event or problem in order to improve practice (Schmeiding, 1999). Critical reflective inquiry uses the steps of : (1) describing an event or incident of practice; (2) comparing these self-narratives with ethical standards and scientific information, and theories; then (3) identifying how individual aspects of the event shape one's response and affect one's practice; and (4) comparing one's intentions in responding with one's actual clinical response. Results of this self-analysis are deeper understandings of the conceptual frameworks that guide one's practice (Kim, 1999; Smith, 1998), since it is considered an effective way for learners to connect theory learned in the classroom with clinical experiences (Davies, 1995). The understanding that is created can further direct and change behaviors, thus demonstrating the learning that has occurred (Chambers, 1999).

Reflexive practice is an intentional learning activity, with a goal of improving practice (Andrews, 1996; Richardson & Maltby, 1995), but it has its limitations. It should be used in situations where students understand that they will not be judged and their reflections will not be evaluated or graded, in order provide a non-restrictive environment that facilitates such reflection (Saylor, 1990). However, it is recognized that reflexive practice leads to the development of tacit knowledge, which is a form or "automatic knowing" based upon learned theory and prior experiences, that cannot be immediately brought to mind, but guides clinical response (Clinton, 1998). This tacit knowledge is also called intuitive practice (Benner & Tanner, 1987).

Nursing educators seek to develop a sense of cognitive and personal awareness in nursing students, called a personal knowing, or "the inner experience of becoming a whole, aware self"(Carr, 1999, p. 26.). Personal knowing has been linked with a growing self-confidence, as

students are able to make sense of their new experiences (Munhall, 1993). This sense of personal knowing is facilitated through the use of educational approaches that incorporate reflection, recall and contemplation of events and responses (Wilkinson, 1999). Key to this educational approach is the tenet that neither experience alone nor contemplation of a proposition in isolation transforms learners and propels them through the stages from novice to expert (Heath, 1998). Rather, it is the contemplation of experience, or reflection-in-action, and reflection-on-action which produces the transformation of the learner, heightening self-awareness of one's personal knowing and integrating cognitive learning with emotional and experiential learning (Jacobs-Kramer & Chinn, 1988; White, 1995). This study of the development of nursing students from novice to competent generalist investigates the first stage of this transformative process by examination of the reflective abilities and contextual variables of students in a beginning nursing course as they develop this tacit knowledge along with development of technical skills.

METHODS

Research design

The assumption used in this non-experimental field study was that adult students in a beginning nursing course can use the process of critical reflective inquiry to identify and examine their demonstration of specific outcome-based competencies introduced in the course. The two research questions that were developed from the primary research question and guided this investigation were: (1) "How are student self-assessments related to contextual variables such as age, gender, course grade, high school SAT score, GPA and academic success as evidenced by progression in the program?" and (2) "Are student self-assessments predictive of academic progress in a baccalaureate nursing program?"

Subjects

The subjects of this study were 64 students in their first semester of a NLNAC-accredited baccalaureate nursing program, or 86.6% of their class. This purposive sample of students represents the number who volunteered to participate in this study, and their participation was not linked to course grade. The University's Human Subjects Review Committee approved this study, and treatment of participants was in accordance with the ethical standards of the APA. All students had already participated in reflexive practice exercises as part of the course activities, but as this was a within-group design, this prior experience would not bias the results.

Instrument

The Self Assessment Content and Description, or SACD, learning exercise, was the primary instrument used in this study. The SACD was developed by the co-author and principle investigator for this study, in order to determine if students knew if and how they were mastering the competencies required in their course. The SACD is a learning exercise that uses the steps of critical reflective inquiry (Schmeiding, 1999) to assist learners to connect classroom content to learning experiences (Davies, 1995). Their reflective answers are recorded by the students, and then coded by the investigators to yield contextual variables of count and richness of description of learning experiences related to course competency and degree of insight regarding how they reached their learning objectives in the class. Critical reflective inquiry occurs when students are encouraged through guided self-reflection, to derive meaning from their behavior (Streubert & Carpenter, 1995). It requires students to think critically about designated activities (in this case, identified learning experiences) and in this case, how they enabled students to gain behavioral competencies necessary for course completion.

After the last day of the course, after their grades had been recorded, students who agreed to participate were asked to respond to four reflective activities:

- (1) Review your course competencies, which are listed in your course syllabus (these were available to all).
- (2) List each competency that you have demonstrated in this course.
- (3) Identify the learning assignments that facilitated your learning process
- (4) Discuss how these assignments assisted you in learning the competencies listed in step #2.

These four directed self-reflective activities were based on the reflective framework of *description* (activities one and two, above), *justification* (activity three), and *critique* (activity four) (Tsangaridou & O'Sullivan, 1994) that has been developed and published elsewhere to "facilitate depth and quality of ...reflective analysis" (McCollum, 2002), p. 39). These self-reflective activities plus the coding and scoring directions, published below, constitute the SACD.

Procedure

The baccalaureate nursing program uses nine learning outcomes for its evidence-based education program. These nine outcomes, measuring critical thinking, cultural competence, political awareness, use of ethics, communication, nursing care, management skills and professional practice, are leveled and sub-divided into competencies for each course and year of learning. For the "Introduction to the Discipline of Nursing" course, these outcomes were leveled and sub-divided into forty-six behavioral competencies that students must demonstrate by the completion of the course.

All students had been told that their participation in this study would be completely

voluntary, and their responses would contribute to the study of critical reflection in nursing students. They were assured that their course grades were already recorded and their answers could not be used in final grade calculations.

The two co-investigators then coded student written responses to the SACD learning exercise independently by first grouping responses by behavioral competency identified by the student. Competencies were counted and then scored initially by two independent coders blind to the names, grades or gender of the participants, using the following pre-determined key:

One point: The student had identified the competencies learned, but could not identify any learning exercises that facilitated learning, or how they had learned them.

Two points: The student had identified competencies and linked learning exercise to them, but could not explain how the exercise assisted learning.

Three points: The student had identified learning exercises, linked them to the competency they assisted, and the student was able to explain how the exercise assisted in their learning of the competency, demonstrating reflection-on-action.

The first two scores required an identification of behavioral competencies, and an identification of the activity that facilitated the learning. However, the third score required rater judgment regarding the degree of detail employed by the student in describing how a particular learning experience had facilitated new learning by the student. To ensure stability in rater judgment, each rater had been orientated to this rating system and provided with several written descriptions illustrating how students describe how they had used learning experiences to facilitate their learning. A score of three for each competency meant that the student had a degree of awareness regarding how a specific activity performed in a particular setting had effected

internal change; that is, students were self-aware of the processes they had used intuitively to grow cognitively as learners, as structured by these learning exercises.

Final scores were then decided by inter-rater consensus. This scoring of student narrative responses yielded an ordinal data set (Boulmetis & Outwin, 2000) that could be used to measure degree of student mindfulness, from a low score (score of 1) to a high score of 3. A retrospective document analysis was performed to gather data regarding age, high school SAT scores, progression in class, GPA and course grade.

Data analysis

Descriptive statistics were used to characterize the sample, and to determine which course competencies were readily identified by students. A multiple correlation coefficient, R was performed to determine the index of the magnitude of the association between the variables to address the first research question. Data were analyzed by general linear model multivariate regression analysis to address the second research question.

DATA/ RESULTS

Descriptive statistics for the sample

Characteristics of the sample are presented first. Mean age was 25 (range=19-55). Most (72%) were age 24 or younger, and 84.6% were female. Most (80.8%) were single, never married. Mean GPA one year after entering the nursing program, as they entered their junior year was 3.0 (range=2.40-3.61). SAT total mean for this group of students was 863.91 (range=600-1130). Final grades for the Introduction to Nursing course, calculated prior to this exercise, ranged from 2.7 to 4.0 on a 4.0 grade scale. 38.5% had taken a critical thinking course concurrent with this course.

Descriptive statistics for course competencies identified

Overall, students stated that they had demonstrated 67.39% (31 of 46) of the behavioral competencies they were expected to learn in the course. For the *critical thinking* competencies, 65.4% identified that they had learned critical analysis techniques, 53.8% said they were learning professional development, 38.5% were able to apply previous knowledge, 23.1% participated in problem-solving, 23.1% had identified factors that impacted their own development in the nursing role, 23.1% supported their views with references, 19.2% compared previous knowledge to new knowledge, 11.5% supported their views with reasoned arguments, 7.7% examined new approaches, and 7.7% had identified health issues important to nursing.

For the *cultural* competencies, 46.2% said they had integrated their client's culture when providing nursing care, and 53.8% said they examined their own cultural beliefs. For the *coordinator of community resources competency*, 15.4% examined their client's enabling health behaviors, and 3.8% helped their clients access health resources. For the *political awareness* competencies, 7.7% said they had learned to discuss nursing's role in shaping health care policies.

For the *ethical and legal* competencies, 11.5% said they had learned to examine the beliefs and rights of others. 7.7% had advocated for their clients by informing them of rights. 3.8% had identified ethical and legal standards that could create ethical dilemmas. For the *effective communicator* competencies, 53.8% demonstrated effective writing skills, 30.8% demonstrated writing that was clear and organized, 19.2% said that their writing was consistent with University standards, 19.2% said they had used various models when communicating. 11.5% said that they had used information technology in managing information, 7.7% had used the

library services to enhance their communication.

For the *competent care provider* competencies, 11.5% said they had identified nursing resources for consultation and learning. For the *professional role model* competencies, 15.4% said they had exhibited professional behaviors that fostered a positive image, and 3.8% said they had recognized nursing's contribution to public health and wellbeing. For the *manager of care* competencies, 34.6% said they had assumed personal responsibility for meeting course expectations, 26.9% said they had evaluated their own actions in carrying out course assignments, and 3.8% were able to identify job descriptions for adjunct health care providers.

To summarize, 100% of the *critical thinking*, *cultural*, *coordinator of resources*, and *effective communication* competencies, 75% of the *professional role model* competencies, 50% of the *competent provider of health care* competencies, 50% of the *political awareness* competencies, 37.5% of the *manager of care* competencies and 30% of the *ethical and legal* competencies had been identified by a student or students as having been learned in this course.

Multivariate analysis results

Multiple correlation coefficients were calculated to measure the degree and direction of any relationship between the variables of: degree of reflexive practice score as measured by responses to the SACD, gender, age, SAT total scores, progression in program, GPA at beginning of junior year, and final grade in Introduction to Nursing course. A significant relationship was found between final grade in the Introduction to Nursing course and SACD ($r=.676$, $p \leq .000$), as well as GPA at beginning of junior year ($r=.420$, $p \leq .037$). Table 1 displays results of multiple correlation coefficients on all variables.

A general linear model multivariate regression analysis was performed, using the

reflexive practice score as the independent variable, and progression in the program, measured by overall GPA at the beginning of junior year, registration in junior year courses, and final grade in the Introduction to Nursing course, as the dependent variables. Results suggest that the reflexive practice score was a significant predictor of progression as measured by final grade in the course (adjusted $R^2 = .541$, $F = 15.139$, $df = 2$, $p \leq .000$). The reflexive practice score did not significantly predict registration in junior year courses nor did it predict GPA at the beginning of junior year (see Table 2 for display of results).

DISCUSSION

“In the paper, we had to make decisions to help set goals, and to logically organize our thoughts. This made the transitions easier.”

As this quote from one of the students in this study demonstrates, beginning nursing students not only can identify what they have learned, but how and by what mechanisms they have learned it. In this study, the identification of competencies learned and how they were learned is illustrative of how beginning nursing students represent nursing and how they view themselves as beginning providers of nursing care. This is important to the understanding of how novice nursing students develop into competent generalists by the time of graduation, because learning is context dependent. In other words, students' learning is affected by their perceptions of themselves and of the tasks at hand (Cowman, 1998).

Based on the descriptive analysis of the competencies identified in this study, the overall majority of students in this beginning nursing course already view themselves as critical thinkers, culturally competent at a beginning level, effective communicators, and able to manage resources. However, they enter the nursing program after attending college-level courses that introduce and

integrate these concepts into course work, and have had opportunities to assimilate these attributes into their own personas. It could be that it is easier to recognize learning that involves these competencies because they are familiar with the concepts, and their perceptions are already positive regarding their own learning of these concepts. They have a much more difficult time identifying the learning competencies associated with a more sophisticated understanding and application of the nursing role.

Upon reflecting on the results, I was surprised that only 50% of the *competent provider of health care* and 37.5% of the *manager of care* competencies were identified in this study. However, this might occur because the assessment learning exercises associated with this course provided the first opportunity for these students to interact with clients in the nursing role. It might take longer than one semester for most nursing students to recognize these competencies and to perceive themselves as learning these roles. It was not surprising, however, to discover that the *ethical and legal* competencies were the hardest group of competencies for students to recognize as having been learned in this course. The students enter this course having taken a bioethical philosophy course, which introduces the commonly used ethical principles such as deontology, utilitarianism, and beneficence. The Introduction to Nursing course requires groups of students to apply these principles in addressing certain ethical dilemmas in health care. It could be that results reflect a general uncertainty or discomfort with using formal procedures as a guide to resolving ambiguous, political and/or unpopular issues in health care. Their difficulty with identifying their own learning in this area might be a characteristic of novice students.

Results of this study were also surprisingly useful in revising the course after the first year of instruction. The SACD yielded results that were useful in three domains of education

(assessment, teaching, evaluation). Student self-reflection scores were used as indicators of student capacity for self-reflection at one point in time (assessment); results were used to revise learning activities to strengthen student learning of particular constructs (such as ethics and manager of care); and results were also used as a subjective measure of the effectiveness of a course in achieving specific learning objectives (evaluation).

We returned to the original course with altered assumptions about the importance of student awareness of their own learning in their mastery of course learning objectives. It appears that when students are aware of the use of particular learning exercises in achieving certain learning objectives, they can then actively direct their own learning, contriving to bridge the distance between what they know and what they need to know, or what they can do and what they need to do. Accordingly, we revised the learning activities used to help students achieve competency in ethical and legal and manager of care constructs at this level, to assist them in consciously directing their own learning in these areas. The new learning activities not only required more self-reflection, but also required students to engage in directed learning activities outside of the classroom, linking them to their life at home and with friends and family. We expect that this added dimension to learning and broadening of application of classroom content will be transformative for them. It will serve to strengthen their awareness of their own understandings of course concepts in these areas, and the cognitive processes they used to learn.

Further studies of student mindfulness as they continue in school might yield useful information about the phenomenon of continued cognitive development in adults and the role that reflexive practice plays in its development. The cognitive development of adult students is of concern to all educators, regardless of discipline. Reflexive practice, critical analysis and student

mindfulness are cognitive practices that are not limited to the nursing profession, but have been identified, studied and discussed in other disciplines, such as education and medicine. This naturalistic inquiry can be adapted for use by educators in determining degree of mindfulness in students, and in tracking the development of mindfulness in their discipline over time as they progress in their program of study.

CONCLUSIONS

“...cognitive development is an apprenticeship—it occurs through guided participation in social activities with companions who support and stretch [one’s] understanding of and skill in using tools of culture” (Rogoff, p. vii).

Results of this study suggest that one factor, an ability to self-reflect upon the processes involved with one’s learning, might be a characteristic that is connected with academic progress. Reflecting on one’s practice can also expand a student’s understanding of and respect for the complexities of the nurses’ role (Baker, 1991). This critical reflective analysis of one’s own learning process can be used as a learning tool as well as an evaluative exercise for student and educator alike (Chambers, (1999). The results also raise the question of whether and/or how much the ability to act intuitively, to reflect critically upon one’s experiences, and to contemplate and review in a mindful way, can be taught. In other words, it would be useful to know if the ability to engage in reflexive practice or to develop a mindful practice is inherently innate, and can be improved through guided teaching/learning experiences designed to improve critical reflexion, or is a learned skill that anyone can master with opportunity and experience. Additional information about the importance and nature of this mindfulness in nursing students would encourage nurse educators to design experiences that could challenge students to reflect upon,

interpret and derive personal meaning from their learning experiences. Information about the learned and/or innate nature of these cognitive processes would also add to our understanding of the role these reflexive practice exercises should play in curricular design and delivery.

On another level, this exercise can also be used by faculty to determine if the learning opportunities they have designed actually enable students to reach the desired outcomes, or objectives, of the course. For example, if very few or no students can identify any learning activities in the course that enabled them to “Examine the interrelationships of personal beliefs about parenting, childrearing, parent-child relationships and the role of family in society” (a learning objective from a graduate-level course developed, taught and evaluated by the co-author), then it behooves the faculty to re-examine the learning activities applied in the course for “goodness-of-fit.” A learning activity might have content validity but not contextual validity. This means that although a learning activity might produce a certain outcome in one setting, it might not be effective in a different type of setting, so it would not “fit” the setting. The SACD-learning activity described here might be adapted by educators in other disciplines to determine if the learning activities designed for a particular course had resonance, or contextual validity, in that course.

Although the content of the course was nursing-related, the SACD process could be examined for use by faculty in other disciplines such as social work, child development or education, to enhance their student’s reflexive practices as well as to determine if students are aware of their own mastery of course objectives or standards relative to their discipline. This might be particularly useful as faculty prepare for accreditation at their Colleges/Universities, and are challenged by the same questions (“Are student self-assessments related to any contextual

variables?” or “Are student self-assessments predictive of academic success?”) as the ones that generated this study.

There is a need to examine the uses and meaning of reflexive practice as a learning tool in nursing education. This study takes this examination to another level, as students' self-perceptions of their learning are identified, coded and scored at the beginning of their nursing program. This allows for a tracking of this self-concept and their view of learning throughout the course of their undergraduate education. This completed study illuminates the complex internal strategies involved in the whole process of learning for nursing students. It adds to nursing education knowledge about the potential uses and value of reflexive practice, not only as a learning exercise, but also as a confirmatory process that cements a new nursing graduate's self perception as a competent provider of basic nursing care.

The SACD assessed student capacity for self-reflection at one point in time, enhanced student self-reflective abilities through participation in the guided learning exercise, and provided a subjective evaluation of the effectiveness of identified learning activities used in the course in achieving required learning objectives. The quote used at the beginning of this section was originally used to describe the cognitive development of children. But it is apparent that our cognitive abilities continue to evolve throughout adulthood, providing new opportunities for self-discovery and concept mastery. This continued cognitive self-development in adults can be assessed, enhanced and evaluated by development of learning exercises, such as this one, that have uses in assessment, in instruction or delivery, and in educational evaluation.

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Table 1. Correlations between variables

Variable	SACD	Gender	Progression	GPA	SAT	Age	Grade
SACD		-0.210	0.364	0.216	-0.164	0.114	.676**
Gender	-0.109		-0.182	0.018	-0.327	0.138	-0.054
Progression.	0.364	-0.182		0.276	0.135	-0.228	0.177
GPA	0.216	0.018	0.276		0.132	0.072	.420*
SAT	-0.164	-0.327	0.135	0.132		-.428*	0.000
Age	0.114	0.138	-0.228	0.072	-.428*		0.083
Grade	.676**	-0.054	0.177	.420*	0.000	0.083	

*p < 0.05 **p < 0.01

Table 2. General linear model multivariate regression analysis to predict GPA, final course grade and registration in junior year courses (N=26)

Independent Variable	Dependent Variable	Type III Sum of Squares	Adjusted R ₂	Mean square	F	<i>P</i>
SACD	GPA	.446	.049	.223	1.616	.221
	Final Course Grade	1.583	.541	.792	15.139	.000
	Registration	.646	.119	.323	2.617	.096