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Lessons Learned from Using the Effective Lifelong Learning Inventory (ELLI) to Support Student Growth and Success

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ABSTRACT

Developing lifelong learning attributes has been shown to help people in personal, academic, and professional realms. The Effective Lifelong Learning Inventory (ELLI) was used in multiple contexts to measure lifelong learning attributes in order to strengthen student success. First-year and senior benchmark studies, in-class applications across multiple content areas, and cross-campus comparisons were completed using ELLI with college students at a large land-grant university. Taken together, these studies provide insights about the learning attributes and needs of students. The benchmarks also make it possible for future cross-institutional comparisons as well as campus-based longitudinal follow-up studies. Outcomes from classroom-based projects support the conclusion that critical self-reflection plays a key role in developing students as lifelong learners. Cross-campus comparisons suggest commonalities across campuses within the larger system. The findings demonstrate that students can acquire lifelong learning attributes through direct instruction and critical self-reflection, as well as by completing their college studies.

Keywords: ELLI, lifelong learning, critical reflection, transformative learning, student success

Lessons Learned from Using the Effective Lifelong Learning Inventory (ELLI) to Support Student Growth and Success

Introduction & Background

Undertaking this project provided an opportunity to revisit the goals of our teaching and focus on new avenues for intervention to enhance the prospects of student success. Do we teach to impart content knowledge, to ensure readiness for a professional life, to provide students with a quality general education which fosters critical thinking, quantitative and advanced literacy skills, or something more? What more could be done to ensure success during and after college?

In response to our own questions, we explored the benefits of helping students to develop as lifelong learners. Multiple projects were conducted across several campuses of a large land-grant university and the results are shared herein.

The attitudes, mindsets, and beliefs that students have about learning – those things underlying the academic skills and knowledge they possess – have as much impact on their success as what they can do academically (Dweck, 2008; Shaffer, Eshbach, & Santiago-Blay, 2015, Terenzini & Reason, 2005; Tinto, 1987). The extant research on growth mindsets (Dweck, 2008), locus of control (Rotter, 1966), and self-efficacy (Bandura, 1982) stands as an important

foundation of our understanding of and approach to fostering student success. Because these areas are already so well studied and incorporated into our work, we decided to probe a different direction, namely the nexus between the work on transformative learning (Brookfield, 1994; Christie, Carey, Robertson, & Grainger, 2015; Fook, 2010; Mezirow, 1978, 1990, 1998, 2009; Morley, 2014; Cranton, 2006) and developing students as lifelong learners (Candy, 1991; Deakin-Crick, Broadfoot, & Claxton, 2004; Deakin-Crick, 2012; Field, 2012; Horrigan, 2016; Houle, 1961; Smith & Spurling, 1999) to better understand and support our students' long-term growth and success. We hypothesize that training students to reflect critically on their experiences, attitudes, and beliefs about themselves as learners, and providing them with the knowledge and skills necessary to make positive change, can help them grow as lifelong learners. This may, in turn, have a positive impact on their lives personally, academically, and professionally.

Why Lifelong Learning?

Field (2012), in a meta-analysis of longitudinal studies conducted on lifelong learning, found strong evidence to support efforts to increase lifelong learning attributes in adults. These studies revealed that "lifelong learning has a measurable impact on people's lives... in three main areas: the economic impact, the impact on individual well-being, and the impact on the wider community" (Field, 2012, p. 894). In a similar vein, a 2016 Pew Research report on lifelong learning and technology states that 73% of respondents consider themselves as lifelong learners, highlighting the value that many Americans place on it (Horrigan, 2016). Personal fulfillment was identified as an important reason for continued learning through the lifespan (87%) as was improving job skills (63 - 83%). Personal, social, and professional benefits were reported in high percentages (65 - 87%) for respondents. Importantly, however, respondents "on the lower end of the socio-economic ladder are less likely to take advantage of lifelong learning opportunities" (p. 22) thus making it even more imperative to provide instruction to economically at-risk students in college. Students from all socio-economic levels can benefit from attending college which can provide opportunities to develop the underlying attitudes and beliefs about continued growth that can support students professionally and personally after graduation.

What is lifelong learning? Smith and Spurling (1999) described lifelong learning as learning that (1) takes place over the course of a lifespan and in many contexts such as formal, informal, or self-directed learning, (2) is intentional on the part of the learner or organization, and (3) occurs through a chosen strategy which can change over time (as cited in Deakin Crick et al., 2004). Candy (1991) described lifelong learning as something that requires the quality of self-direction (e.g., personal autonomy, managing the learning act, independent learning, and learner-controlled activities). The qualities of self-direction and intentionality are also very much in line with the tenets of adult educational practice (Brookfield, 1995; Cranston, 2006; Knowles, Holton III, & Swanson, 2005) and therefore fitting for use with college-age students. In the case of this paper, we chose the Effective

Lifelong Learning Inventory (ELLI), a 72-item online inventory, as the tool to measure lifelong learning attributes and provide information to students about themselves as lifelong learners (Deakin-Crick et al., 2004).

Dimensions of lifelong learning. ELLI researchers have found that lifelong learning has seven different dimensions shown to “differentiat[e] . . . between efficacious, engaged, and energized learners and passive, dependent, and fragile learners” (Deakin Crick et al., 2004, p. 247). Deakin-Crick and Yu (2008) validated the instrument and refined the seven different dispositions towards lifelong learning measured in the current inventory. These are briefly summarized below from ELLI’s guidebook, *My Learning Power* (Vital Partnerships, 2011):

Creativity - To find new ways to approach ideas, typically using diagrams and visual representations of concepts; welcome the “inklings that bubble up into their minds” as inspiration for new ways of approaching what they need to learn

Resilience - To keep going when things get tough; steadiness of purpose; overcoming obstacles

Changing & Learning - Learners can take control of their learning and adapt to learning challenges; they accept that they can change as learners and are able to develop new strategies

Strategic Awareness - Making plans to accomplish goals, managing oneself and the processes involved in attaining goals, and taking responsibility for learning

Meaning Making - Ability to make connections and integrate ideas; recognize how learning relates to ideas that are already of interest

Critical Curiosity - The desire to delve into topics and get beneath the surface; willing to challenge and question

Learning Relationships - A balance between reaching out for help when it is needed, but also being confident in some aspects of private learning.

These seven dimensions became the basis for measurement and instruction for those participating in the various projects described herein. Further details about ELLI can be found in the methods section of this paper. With the benefits of lifelong learning established, what would the best approach be for helping students to develop in this way?

Transformative Learning

Mezirow (1978, 2009) describes transformative learning as a process by which growth can occur. The process begins as adults are faced with some sort of “disorienting dilemma” that acts as a catalyst for critical reflection about their beliefs, values, judgments and feelings, and the often unconscious assumptions that govern them (Mezirow, 1990, 1998). Brookfield (1995) also described the value of reflection upon “critical incidents” to improve understanding of experiences with the goal being personal growth and development. The role of the imagination and memory is important for both Mezirow and Brookfield as it makes possible the opportunity to imagine and construct new outcomes.

Mezirow and Marsick (1978) identified steps in the reflective process that lead to transformation. These include the disorienting dilemma, self-reflection, identifying underlying assumptions, developing an action plan for change, gaining the skills and knowledge necessary to implement change, practice of the new approach, and finally integration into new instances and experiences.

There is some criticism about whether Mezirow's theory of transformative learning is more metaphor than actual theory (Howie & Bagnall, 2013). However, Taylor (1997) completed an extensive literature review in an attempt to support Mezirow's work. In it, Taylor (1997) cited many studies that support Mezirow's research, but at the same time, he identified the need to further explore the importance of context, cultural diversity, and different ways of knowing and understanding beyond reflection such as intuition and empathy. Despite the challenges to Mezirow's approach, there is enough evidence to rely on the positive impact of transformational learning for personal growth and change (Christie et al., 2015; Deakin-Crick et al., 2004; Taylor, 1997).

Research Hypotheses

Applying the existing research on lifelong learning and critical self-reflection, we decided to explore several questions. First, and most importantly, we wanted to explore the connection between critical self-reflection and growth in lifelong learning attributes. We hypothesized that critical self-reflection would positively impact the development of lifelong learning attributes (H1). Second, the benchmark and cross-campus projects allowed us to make comparisons across groups. We hypothesized that groups from different campuses which had members from the same academic year would have similar ELLI profiles (H2), making it possible to design common interventions across campuses to encourage success, and finally, that seniors would have different ELLI profiles from their first-year counterparts (H3), indicating growth in certain areas as a general result of attending college.

In the next section of the paper, we describe the various projects completed and methods used to explore our research questions.

Methods

Institutional Review Board (IRB) proposals were submitted and approved for all projects in this study.

Measures

First, ELLI, a 72-item online self-report inventory measuring seven dimensions of lifelong learning was used. Students receive the outcomes of the inventory immediately upon completion of the survey in the form of a spider diagram (Figure 1). Scores for each dimension are plotted on a scale from 0-100. Students may take ELLI multiple times, and two scores can be compared on the spider diagram at a time to show change over time.

FIGURE 1.

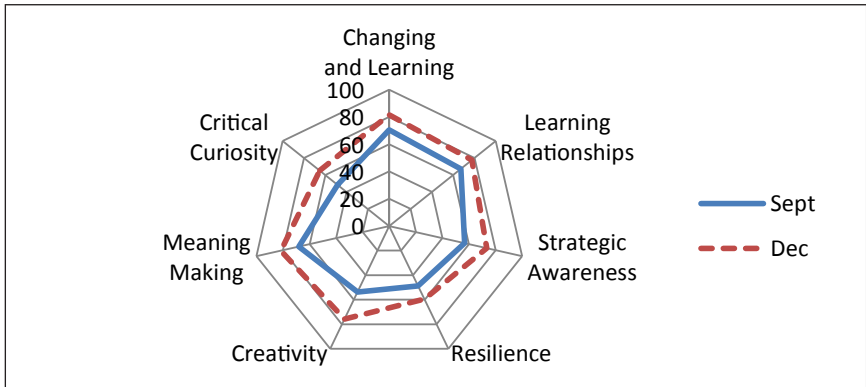


Figure 1. Sample spider diagram of student pre- and post-semester ELLI scores (Shaffer et al., 2015).

Second, for class-based integration projects, student responses to reflection assignments were used to obtain insights about student experiences.

Participants and Projects

First-year and upper-division students at three satellite campuses of a multi-campus four-year university system were recruited to participate. Students were consented and their data were used in the analyses according to the consent protocol. Participating campuses will be referred to as Campus 1, 2, and 3 respectively. There were two types of projects completed using ELLI: benchmarking and in-class integrations.

Procedures

Benchmarking projects. To get a baseline for comparison, several benchmarking projects were completed:

First-year benchmark (Campus 1): 175 first-year students (55% male and 45% female) took ELLI at the beginning of Fall 2015, recruited from the following courses: a first-year seminar summer program, English composition, and a college algebra course.

First-year benchmark (Campus 2): 45 first-year students (13% male and 87% female) were given ELLI at the beginning of Fall 2017 in a Human Development and Family Studies (HDFS) course.

Senior benchmark (Campus 1): 50 seniors (46% male and 54% female) were given ELLI towards the end of the semester in which they graduated, in Fall 2016 or Spring 2017, from multiple disciplines (business, information sciences and technology, HDFS, psychology, and biology).

Upper-division HDFS course on program planning and evaluation (Campus 3): 15 students (21% male and 79% female) took ELLI pre-semester. These scores were compared with upper division HDFS students across the three campuses.

Control group (Campus 1): 48 students (50% male and 50% female) took ELLI pre- and post-semester and received no instruction in lifelong learning. Students were enrolled in a first-year English composition course, a math course, and an environmental science general education course (Moore & Shaffer, 2017).

ELLI results were provided to these students immediately upon completion of the inventory through the ELLI website. Each student received an information packet, *My Learning Power* (Vital Partnerships, 2011), describing the ELLI dimensions, useful research, and strategies to improve in each area. No formal instruction about ELLI or lifelong learning was given before students took ELLI for the benchmark data collection.

In-class integration projects. In these projects, students took ELLI pre- and post-semester. Lifelong learning dimensions were integrated into instruction in varying degrees and changes noted across the groups. Reflection activities were assigned to help students process and apply lessons learned to their lives. Five separate data collections took place as follows:

College reading course (Campus 1): 90 students took a college reading course (2013 – 2017) which was supplemented with extensive direct ELLI instruction and critical self-reflection assignments.

Coping with stress and personal development course (Campus 1): 17 students took this course. No direct instruction of ELLI was given; however, critical self-reflection about personal development was central to the course.

Introductory HDFS course (Campus 2): 16 students took a general education course introducing them to the field of HDFS. Only minimal direct instruction of lifelong learning occurred.

Upper-division HDFS family interventions course (Campus 2): 27 students took the course. Extensive instruction of ELLI and personal reflection occurred in this course.

Data Analysis

Different statistical analyses were used to investigate the following hypotheses:

(H1): Critical self-reflection positively impacts the development of lifelong learning attributes

(H2): Cross-campus groups from the same academic year have similar ELLI profiles

(H3): Differences exist between first- and senior-year ELLI benchmark scores

Paired samples t-tests were used to compare pre- and post-semester ELLI scores for in-class integration projects (H1). Independent samples t-tests were used to compare ELLI outcomes between two groups (H2 and H3). Cohen's d was used to distinguish practical significance from statistical significance by calculating effect sizes as follows: small effect size at $d = 0.2$, medium at $d = 0.5$, and large at $d = 0.8$ (Cohen, 1992). One-way ANOVA was used to compare ELLI scores for upper-division students across Campuses 1, 2, and 3 (H2).

Student responses to self-reflection assignments from the in-class integration projects were also used to gain general insights into the observed ELLI changes.

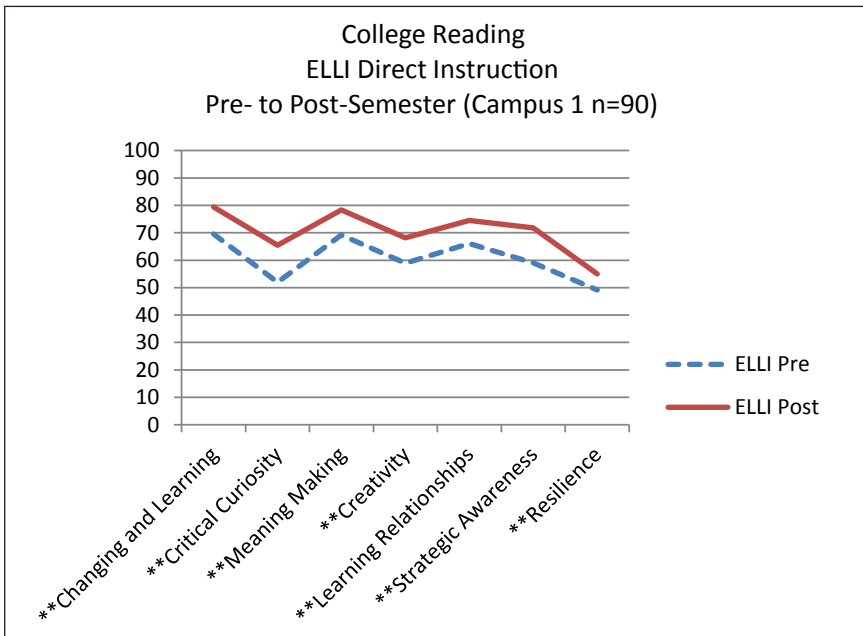
Results

Impact of Critical Self-Reflection (H1)

Does critical self-reflection positively impact the development of lifelong learning attributes? Data analyses revealed that direct instruction of lifelong learning with a critical self-reflection component does lead to gains in ELLI.

For the Campus 1 college reading course which included direct instruction and critical self-reflection (Figure 2), paired samples t-tests pre- to post-semester showed statistically significant gains in all dimensions of lifelong learning. Further, Cohen's d values suggest a moderate practical significance ($d > .5$) for all dimensions except Strategic Awareness which had a large effect size ($d = .81$) and Resilience which was midway between small and medium ($d = .36$).

FIGURE 2

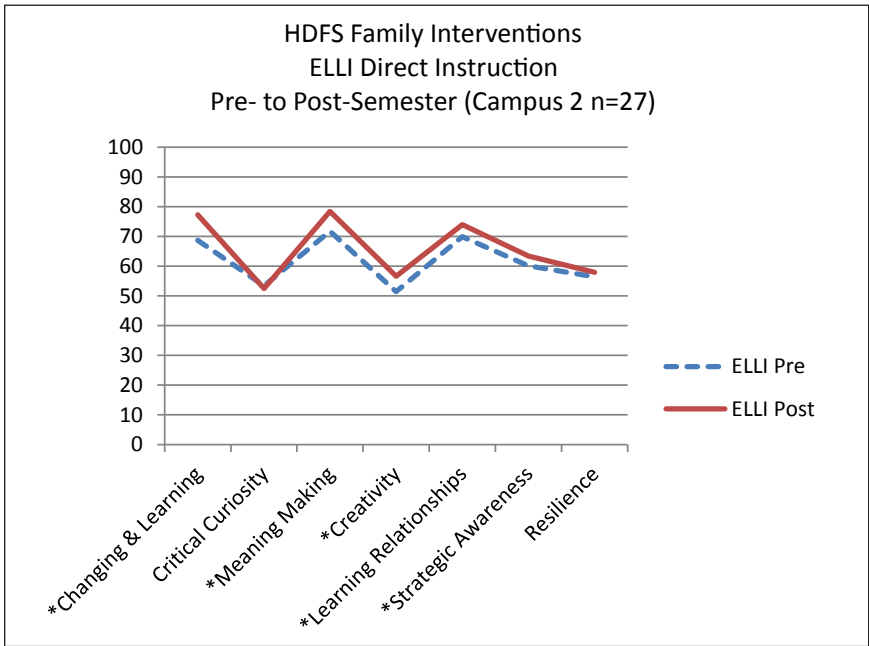


** $p < .001$

Figure 2. Pre- and post-semester ELLI scores in a college reading course.

The Campus 2 HDFS family interventions course (Figure 3) also had direct instruction of lifelong learning and critical self-reflection. Paired samples t-tests pre- to post-semester showed statistically significant gains in all dimensions of lifelong learning. However, Cohen's d values suggest a moderate practical significance ($d > .5$) for only two dimensions, Changing & Learning and Meaning Making, with the other areas showing a small effect size ($d < .2$).

FIGURE 3

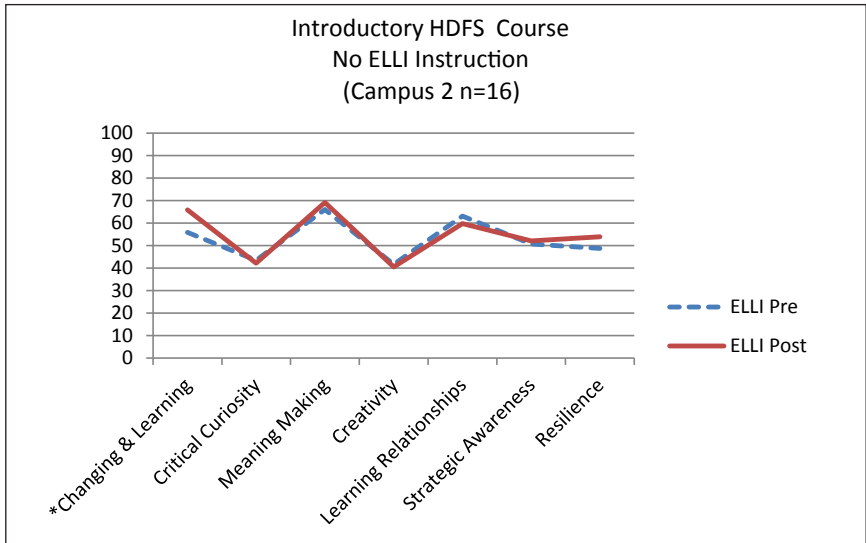


* $p < .05$

Figure 3. Pre- and post-semester ELLI scores in an HDFS family interventions course.

In courses where lifelong learning and critical self-reflection were not part of direct instruction, few or no statistically significant gains in ELLI were found pre- to post-semester. Examples include Campus 2 HDFS introductory course (Figure 4) and Campus 1 control group (Figure 5).

FIGURE 4



* $p < .05$

Figure 4. Pre- and post-semester ELLI scores in an HDFS introductory course.

FIGURE 5

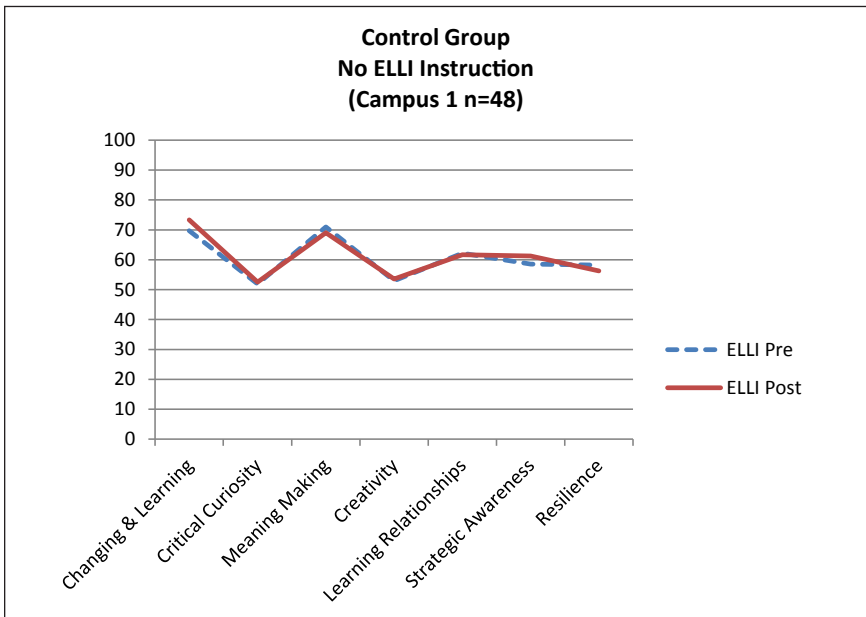
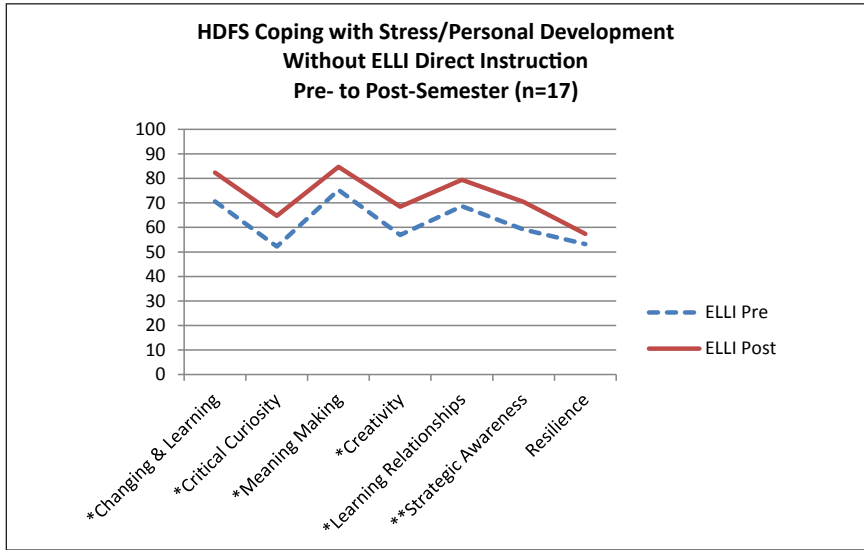


Figure 5. Pre- and post-semester ELLI scores in a control group (Moore & Shaffer, 2017).

Are there circumstances under which students grow as lifelong learners without direct instruction? In the course on personal development and coping with stress, where critical self-reflection was a key aspect of the course, results did show statistically significant gains in most ELLI dimensions without any direct instruction in lifelong learning (Figure 6). Further, Cohen’s d values suggest a moderate to high practical significance ($d > .5$) in all dimensions except Resilience. Results of a paired samples t-test are available in Table 1.

FIGURE 6



* $p < .05$ and ** $p < .001$

Figure 6. Pre- and post-semester ELLI scores in an HDFS coping with stress and personal development course.

Table 1

Results of Paired t-tests and Descriptive Statistics ELLI Dimensions Pre- and Post-semester in Personal Development and Coping with Stress Course

TABLE 1

Outcome	Pre-semester (n = 18)	Post (n = 18)		t	d
	M (SD)	M (SD)	95% CI		
Changing & Learning	70.59 (19.3)	82.35 (14.52)	-18.68,-4.85	-3.61*	-.69
Critical Curiosity	52.21 (19.83)	64.71 (17.31)	-19.57,-5.44	-3.75*	-.67
Meaning Making	75.29 (13.75)	84.71 (10.07)	-14.77,-4.05	-3.72*	-.78
Creativity	56.86 (18.42)	68.41 (18.1)	-19.22,-3.88	-3.19*	-.63
Learning Relationships	68.63 (20.28)	79.41 (16.38)	-16.52,-5.05	-3.99*	-.58
Strategic Awareness	59.15 (13.39)	70.42 (17.21)	-16.65,-5.9	-4.44**	-.73
Resilience	53.14 (13.23)	57.35 (12.88)	-10.66,-2.24	-1.39	-.32

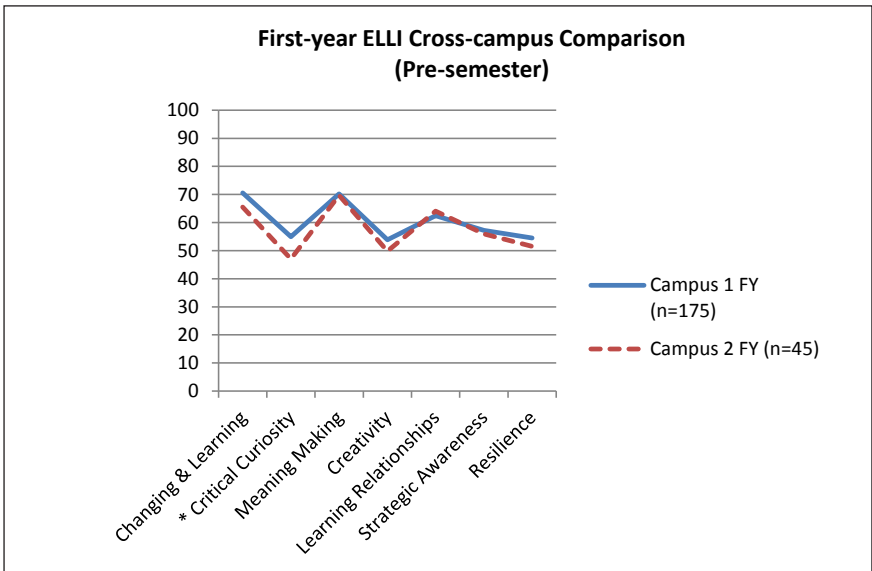
* $p < .05$ and ** $p < .001$

Cross-Campus Comparisons (H2)

What meaningful comparisons exist between campuses? There are similarities in ELLI profiles across campuses in two circumstances: 1) in the first-year student samples between Campus 1 (first-year benchmark) and Campus 2 (first-year students in introductory HDFS courses) and 2) between the upper division HDFS courses across all three campuses.

Using an independent samples t-test, we found no statistically significant differences in any of the ELLI dimensions except Critical Curiosity in the first-year comparisons between Campuses 1 and 2 (Figure 7).

FIGURE 7

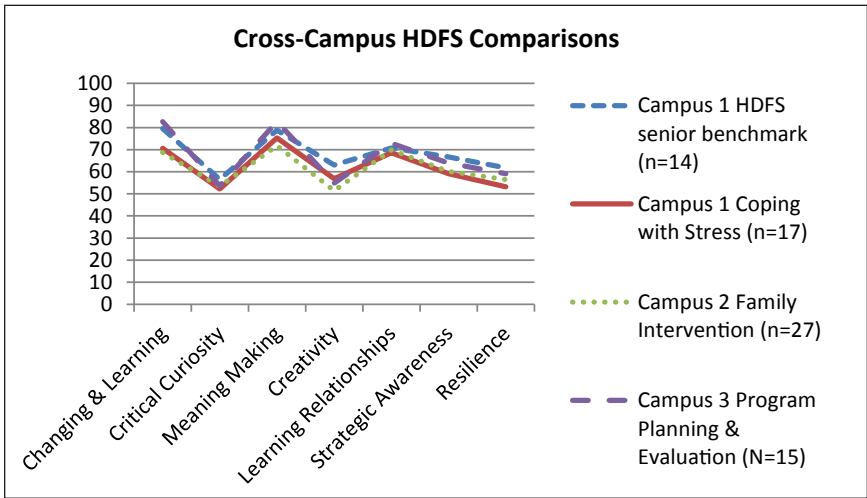


* $p < .05$ and ** $p < .001$

Figure 7. First-year ELLI comparisons cross-campus.

A one-way ANOVA showed no statistically significant differences on any ELLI dimension for upper-division HDFS students across all three campuses (Figure 8). These scores are from the senior benchmark data collection (no ELLI instruction) and from the upper-division class-based projects before instruction commenced.

FIGURE 8



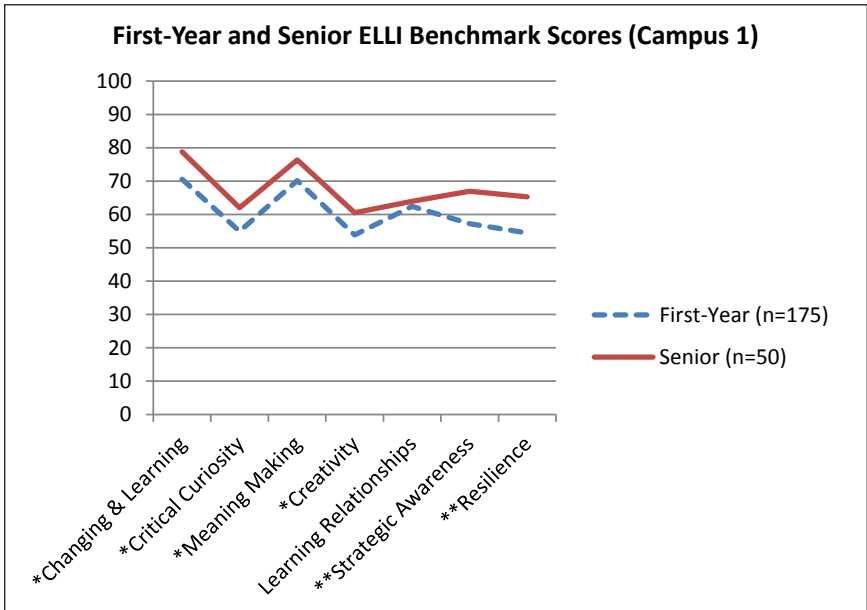
* $p < .05$ and ** $p < .001$

Figure 8. Upper-division HDFS ELLI comparisons across campuses.

First-Year/Senior Comparisons (H3)

Do meaningful differences in ELLI scores exist between the first- and senior-year benchmarks? ELLI scores for seniors showed statistically significant gains over first-year student data in all dimensions of ELLI except Learning Relationships (Figure 9). Further, Cohen's d values suggest a moderate to high practical significance for both Resilience ($d = .70$) and Strategic Awareness ($d = .52$). Results of an independent samples t -test are available in Table 2. None of the students in the senior sample had taken a course in which ELLI had been integrated.

FIGURE 9



* p < .05 and **p < .001

Figure 9. First-year and senior ELLI benchmark scores.

Table 2

Results of t-tests and Descriptive Statistics ELLI Dimensions by Group

TABLE 2

Outcome	First Year (n = 175)	Senior (n = 50)	95% CI	t	d
	M (SD)	M (SD)			
Changing & Learning	70.55 (17.87)	78.8 (15.16)	-13.28, -3.21	-3.25*	-.43
Critical Curiosity	54.98 (19.79)	61.7 (15.05)	-12.18, -1.86	-2.70*	-.36
Meaning Making	70.19 (16.18)	76.33 (15.06)	-11.03, -1.26	-2.50*	-.33
Creativity	53.86 (19.08)	60.52 (16.86)	-12.19, -1.12	-2.39*	-.32
Learning Relationships	62.2 (18.3)	63.93 (16.42)	-7.15, 3.59	-0.66	-.08
Strategic Awareness	57.21 (16.69)	66.94 (15.36)	-14.73, -4.74	-3.88**	-.52
Resilience	54.50 (16.05)	65.30 (14.61)	-15.57, -6.04	-4.51**	-.70

*p < .05 and **p < .001

Student Reflections

Student comments were gleaned from various reflection instruments assigned in classes where ELLI was integrated. Representative comments are included from each course with more descriptive analysis in the discussion section. Questions are provided when context is needed.

Campus 2 upper-division family intervention course. Students reflected on the changes in ELLI pre- to post-semester and answered questions about growth from a survey.

Questions: How did your learning power strategies [ELLI] change from the first time to the second time you took the test? Are you surprised by the results? What do the results tell you about your understanding and efforts to enhance your learning skills?

Comment 1: "They actually changed dramatically and I'm very proud of myself. I was a little surprised at the results, but I know they are true because I worked hard this semester to make it work. I tried my best to work on changing my learning strategies for the better to make me a better student. The results explain that I was motivated to enhance my learning skills."

Comment 2: "I improved since the first time. I was surprised but I was under a lot of stress this semester so I had to make good choices and how to well manage my time and I learned a lot about myself that way."

Question: How do the 7 learning power strategies (ELLI) test results relate to how you are doing in your classes this semester?

Comment 1: "Learning to work with others and let others have a chance has really helped me to be successful. Also, realizing that it is okay to get help in some subjects has really helped me."

Comment 2: "I think the results of the first ELLI I took did show me correctly where I was at the beginning of the semester. Now taking it for the second time at the end of the semester, I think I definitely improved on a lot of my skills and took information from the results, and put them into action."

Campus 1 coping with stress & personal development course. In this course, students did not study lifelong learning directly. Student narratives from reflections were used to identify common areas of challenge and growth.

Comment 1: "Who am I? I have thought long and hard for the best answer to this question...I am not the same person I was before I began...I take the time to look at what happened from a different perspective...before jumping to any conclusion."

Comment 2: "You can do what you think is impossible."

Comments 3 & 4: "When I was a teenager, my father abused me physically, mentally, emotionally, and verbally. I felt as though it was my fault. I felt that I deserved the abuse." Later in the course, the same student wrote, "I am more

than willing to consider forgiveness...Forgiving someone does not mean that the abuse is okay it means you will no longer allow those to have power over how you feel.”

Campus 1 college reading course. In this course, students completed reflections based on the ELLI scores they wanted to improve.

Comment 1: “From using the experience of curiosity in my anthropology class, I learned that it really makes me pay attention a lot more. While I was asking questions to myself in class, I stayed on topic with the lecture and it also helped me avoid getting off track and zoning out. I feel that if I continue to be curious in the classroom and use critical curiosity strategies, my overall grades will increase.”

Comment 2: “The idea introduced in Rick Hansen’s “Taking in the Good” might [be] a good way to build my overall interior wellness. It is easier to [wreck] the fort from its inside, this quote also applies to human being.”

Discussion

This study points out that students can make statistically significant gains in lifelong learning dimensions under diverse settings. We learned the following about our three hypotheses: (H1): Critical self-reflection positively impacts the development of lifelong learning attributes under certain circumstances; (H2): Cross-campus groups from the same academic year have similar ELLI profiles; and (H3): Differences exist between first- and senior-year ELLI benchmark scores.

Significance, Limitations, and Possibilities for Future Research

H1. There was an important common thread among the in-class integration projects: in those classes where changes in ELLI scores were manifested, critical self-reflection activities were present. Even when students did not study lifelong learning directly, as in the coping with stress course, students entered a similar process of self-knowledge, critical reflection, action planning, and change management which seems to have also activated their growth as lifelong learners. The transformational process that Mezirow and Marsick (1978) described, when applied in these course-based projects, did indeed lead to transformation by most participating students, as measured by ELLI.

Student reflections clearly showed a growing awareness of their own ability to foster growth and change in their lives, and their improved ELLI scores illustrated these important changes. Students were often surprised and happy to discover that by using just one new strategy or approach, they could be more curious, resilient, or creative. One could see from the comments that students began to understand that lifelong learning (and other) qualities were not fixed, as if they were an unchanging aspect of personality, but could change with critical attention and implementation of effective strategies. The representative comments included in the results section illustrate this “awakening” to the possibility of change. Responses indicated that many students developed a greater

sense of self as well as a greater ability to look at things from a new perspective. Overall, many students expressed that the strategies learned in the courses were beneficial for their personal, academic, and future professional lives.

What happened then in the case of the Campus 2 HDFS family interventions course (Figure 3) which showed ELLI gains that were statistically but not practically significant? It seems important to compare the type and frequency of reflections asked of students. In this case, students were asked to reflect on their ELLI scores at the beginning and end of the semester as they related to their current experiences. This certainly led to a deeper understanding of the ELLI dimensions and began the process of building connections to students' own experience. However, it has become clear through these projects, that for actual transformation to occur, students need more frequent opportunities for self-reflection to take place along with prompts which help them work through all the stages that Mezirow and Marsick (1978) describe, including the integration of what they are learning into new instances and experiences. For example, students in the coping with stress course were explicitly asked to extrapolate their learning about a topic (forgiveness, e.g.) into an imagined or real new situation. Students in the college reading course were sent out to apply their learning into new situations and then complete a reflection. These differences, along with the increased frequency of reflective work, may have contributed to the stronger gains in ELLI in those two courses.

Other research supports this conclusion. Students need explicit preparation to become effective at the kind of critical self-reflection that can lead to change, including the construction of effective prompts for assignments which move students through all the stages of transformation, fostering critical thinking and helping them to identify underlying assumptions (Brookfield, 1995; Dymont & O'Connell, 2010; Dzubak, 2013; King & Kitchener, 1994; Mezirow & Marsick, 1978; Ullmann, Wild, & Scott, 2003).

In addition to the importance of fostering effective critical reflection, another influencer described by ELLI researchers is the development of a common language for change (Deakin-Crick et al., 2004). For example, if students are working on developing resilience, the language of self-efficacy can be modeled, and its use encouraged in writing, discussions, and feedback. As students develop the language associated with each ELLI dimension, they can, as Rossiter (as cited in Morley, 2005, p. 1424) suggested, begin to develop the "conceptual space" in which change can take place. Language facilitates this development, giving students the vocabulary needed to create new understandings and develop new perspectives about both the problem and alternative solutions (Morely, 2013). Through deconstruction of the current state and reconstruction with new understanding and strategic approaches, new realities come forth (Brookfield, 1995; Fook, 2010; Mezirow, 1998; Morley, 2013). It seems to follow that opportunities to learn from personal experiences can have multiple benefits, from developing a stronger sense of agency and self-efficacy to the lifelong

learning attributes that can support students through a lifetime of learning. Applying lessons learned to future scenarios helps solidify the learning.

H2. First-year and upper-division groups had similar ELLI scores respectively, making it tempting to assume a common student profile departmentally and institutionally across campuses. This could be highly beneficial in developing common programming for students across campuses and in preparing assessments for external evaluation such as institutional accreditation, but the dataset is still too small in many cases, is limited to one department, and has a gender representation too disparate from the population to make any generalizable claims in terms of a common campus profile at this time. Future studies are being planned, however, to build on the findings collected here, with the hope being to develop a more generalizable understanding of the traits and needs of college students.

H3. While ELLI is being used extensively in the U.K. and elsewhere globally, this project represents one of the first benchmarking efforts using ELLI in the United States at the college level (Z. Rozelaar, personal communication, April 17, 2018). This will make it possible to begin comparisons across institutions in future studies, especially using the first-year benchmark dataset which is the largest and most representative sample in the collection.

While the first-year benchmark sample was large and representative of the population in terms of gender, in contrast, the senior benchmarking sample was small, consisting of only about 50% of the total graduates; therefore, more data collection would be warranted to make sure the results are stable. With this caveat in mind, our study does indicate that students make lifelong learning gains from first to senior year, without having any direct instruction in lifelong learning. Effect sizes in the data indicate that the highest areas of practical significance occurred in Strategic Awareness and Resilience. This is unsurprising in that students must be able to set and meet goals to reach graduation. Similarly, research on resilience demonstrates that students can become more resilient by working through challenges, although a more detailed explanation of this research extends beyond the scope of this paper (National Scientific Council on the Developing Child, 2015; Reivich & Shatte, 2003). In both cases, the typical college experience would provide students with many opportunities to practice and expand their competency in both aforementioned areas.

A more important question remains regarding the lack of gains in the other areas measured by ELLI. Additional institutional benchmark studies would provide valuable information about whether this is a more global finding, or one specific to this institution. In either case, this benchmark provides actionable data that could be used institutionally for improvement in the other areas.

Ultimately, the fact that student samples show gains between first- and senior-year benchmarks is welcome news in a current political and social climate which has begun to question the value of a degree in higher education (Valletta, 2016). Yet, larger questions remain. Who was lost in that waiting game from first to

senior year? Who dropped through the cracks while others stayed on to develop those important qualities of Strategic Awareness and Resilience? The Pew Research report on lifelong learning (Horrigan, 2016) pointed out that socio-economic status can play a role in who takes advantage of lifelong learning opportunities. This brings us to an important question: Since we know the value of lifelong learning, should we make a more concerted effort early in the academic careers of at-risk students, to connect them to opportunities that involve critical self-reflection and lifelong learning development? This could involve both coursework as well as co-curricular activities. If all students acquire those habits of mind and heart earlier in their educations, will more students persist towards graduation and gain the skills necessary to adapt and thrive throughout life? These important questions create possibilities for future research.

Conclusion

From existing research, the evidence is clear that gaining lifelong learning attributes is valuable (Candy, 1991; Field, 2012; Horrigan, 2016; Houle, 1961; Knowles, 1975; Koch et al., 2018; Tough, 1976). This series of projects points out several ways that college students could acquire lifelong learning attributes: through direct instruction, critical self-reflection with effective prompts, and by completing a college education. Future research will examine these questions across a larger, more representative student population with a focus on more systematic critical reflection prompts for student writings.

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