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Life101 Enhances Healthy Lifestyle Choices in Pre-Health Undergraduate Students

Mahtab Jafari

University of California, Irvine, mjafari@uci.edu

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Abstract

Stress levels in college students are increasing at an alarmingly fast pace. To combat this rising tide, universities need effective tools to promote student well-being and help them to recognize and manage their stress. One approach is to teach students basic lifestyle skills to cope with stress and achieve wellness. This is important as it not only increases students' retention within a chosen field of study, but assists them to achieve personal and academic success. To inspire our undergraduate students to adopt healthy lifestyle choices, a once-weekly course titled "Life101" was developed with topics that focused on students' wellness such as stress management, emotional intelligence, financial management, nutrition, and exercise. Classes were taught through a combination of lecture, multimedia videos, and discussions. Here, we share our observational findings outlining the potential benefits (short- and long-term) for students participating in Life101. Based on pre- and post-course survey data from students, both in-class and online, Life101 had a significant positive impact on the lifestyle of our students. The main outcomes from this study were: 1) both in-class and online courses resulted in positive lifestyle changes in our students; 2) online students showed greater mastery of course topics compared to their in-class peers; and 3) long-term benefits from the course were reported after a one-year follow-up. Although, this collective positive impact may suggest that offering Life101 to undergraduate students can serve to improve students' mental and physical health, a prospective study is needed to confirm these findings.

Keywords

Undergraduate education, healthy lifestyle, stress management, emotional intelligence, exercise, nutrition, behavioral changes.

Cover Page Footnote

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Introduction

Sources of undergraduate stress

The rates of stress-induced mental and physical health disorders are increasing alarmingly among undergraduate students (Beiter et al. 2015; Brunner, Wallace, Reymann, Sellers & McCabe 2014; Gallagher 2015), with about a quarter of them showing one or more signs of mild to moderate mental-health distress, including stress (27%), anxiety (25%) and depression (22%) (Beiter et al. 2015). Student stress is further amplified by the daunting challenges many first-year students face as they transition to university. Not only are they away from familiar settings (Stroebe, Schut & Nauta 2015), but they face higher academic standards (Westrick, Le, Robbins, Radunzel & Schmidt 2015). Increased expectations of mastery of high volumes of material, heightened reliance upon exams to determine course performance and their own poor time management are significant sources of anxiety for the majority of students (Kumaraswamy 2013). Beginning in 1997, 93% of first-year university students reported feeling overwhelmed by academic demands; this figure had increased to 96% by 2009 (Guthman, Iocin & Konstas 2010; Wyatt & Oswalt 2013). A 2014 study by the American College Counseling Association showed that 52% of university students seeking help had severe psychological problems, compared to 44% in 2013 and 16% in 2000, further demonstrating the growing trend of stress in university students (Reetz, Krylowicz & Mistler 2014). Moreover, studies from the mid-2000s found that 64% of university students who chose to withdraw did so for reasons related to mental health (Allen, Robbins, Casillas & Oh 2008; Gold & Albert 2006).

As academic success is a central pillar in the life of a university student, inability to appropriately manage poor academic performance can further heighten feelings of anxiety and depression, and, if not addressed, suicidal ideation (Banu, Deb, Vardhan & Rao 2015; Francis & Horn 2017; Wilson et al. 2014). Though these findings are shocking, they are not surprising. Today's undergraduates face increased pressures not only for academic success, but also for adjusting to new surroundings and responsibilities; moreover, the majority must also cope with the heightened cost of tuition (Fosnacht & Dong 2013). Taken together, this highlights the necessity for universities to provide students with effective tools to manage their emotional and psychological well-being for long-term academic success.

The proportion of undergraduates with mental-health needs

The decline in the emotional health of university students over the past decade is partially attributable to poor lifestyle choices (Douce & Keeling 2015; Eagan et al. 2014; Lewin 2011; Lin & Huang 2013b). One study reported that 34% of university students felt so depressed that it was difficult to function; more than 50% of these students reported having experienced overwhelming anxiety, and 8% reported having seriously considered suicide (American College Health Association 2012). Furthermore, the rate of depression-related suicide accounts for 1,100 university deaths annually (Schwartz 2011). Further exacerbating the issue is the record number of visits and increased wait times reported by campus counseling centres (Hoffman 2015; Misner 2014; Prince 2015), indicating undergraduate students' need to learn how to adopt healthier lifestyles to control their stress levels.

Pre-health majors face increased rates of stress

Pre-health undergraduates are prone to higher levels of academic-related anxiety and “burn-out” (Lin & Huang 2013b) than their counterparts majoring in other subjects, partly because of the increasingly competitive admissions process into graduate schools of medicine, pharmacy, dentistry and nursing (Goff 2011; Lin & Huang 2014). Not surprisingly, then, the level of stress and depression is significantly higher among students in the health sciences (e.g., medicine, pharmacy, dentistry and nursing) compared to other majors (Kiersma, Chen, Yehle & Plake 2013; O’Neill, Wallstedt, Eika & Hartvigsen 2011). One meta-analysis found that globally, almost one-third of all medical students suffered from depression (Puthran, Zhang, Tam & Ho 2016). Hence, pre-health students should be equipped with practical stress-management tools to prepare them for the challenges in graduate health-care education and in their future careers.

The need for coping strategies

Since the stress that students face is unlikely to recede (Francis & Horn 2017), educational institutions need to be proactive in offering courses and services to teach students how to cope with stress and how to achieve wellness. In 2013, a course titled “Life101” was developed at the University of California Irvine (UCI) with the ultimate goal of teaching undergraduate students how to handle stress and adopt a healthy lifestyle. The course covered a broad range of lifestyle topics including motivation, stress management, exercise, nutrition, emotional intelligence and personal financial management. Due to these topics being applicable to the entire UCI undergraduate community, Life101 was offered either in-class or online, and open to all UCI undergraduate students, but was a mandatory requirement for pharmaceutical-sciences majors. As a result, the majority of students enrolled were primarily pre-pharmacy (52% in-class and 74% online).

Selected areas of course focus

Of the topics presented in Life101, emotional intelligence, financial management and nutritional and physical activity are the central focus. Each of these topics has an independent impact on stress management. Specifically, increasing one’s understanding of emotional intelligence (Fletcher, Leadbetter, Curran & O’Sullivan 2009), fiscal management (Hancock, Jorgensen & Swanson 2013) and nutritional and physical health (Deckro et al. 2002; Ferrara 2009) are associated with decreased stress and depression.

Emotional intelligence

A key topic in Life101 is emotional intelligence (EI), defined as an individual’s aptitude in discerning, classifying, and appropriately responding to his/her own emotions and the emotions of others (Goleman, 2006). The importance of EI in fostering stress management and resiliency is highly relevant in people-oriented professions, such as health care, social work and education (Birks, McKendree & Watt 2009; Heffernan, Quinn Griffin, McNulty & Fitzpatrick 2010; Schulze, Wilhelm & Kyllonen 2007). Health-care professionals are highly prone to “burn-out”, arising from emotional exhaustion, depersonalisation, and/or feelings of diminished personal accomplishment (Lin & Huang 2013a). One solution, embraced by many programs in medicine (Jeffrey 2015) and pharmacy (M. H. Nelson, Fierke, Sucher & Janke 2015) is recognition of EI as a teachable and crucial skill for the effective practice of these fields (Bradberry & Greaves 2006); this highlights the growing trend of incorporating EI into post-secondary training. The earlier

students are introduced to EI, the greater the psychosocial benefits (Dacre Pool & Qualter 2012). Hence, instruction in how to improve one's EI was presented in Life101.

Financial management

Instruction in financial management was also included in Life101. The majority of undergraduates receive no formal money-management training prior to entering university (Borden, Lee, Serido & Collins 2008), and many lack the skills for sound fiscal judgment. Approximately 49% of young adults (ages 25-34) with a tertiary education are financially illiterate (de Bassa Scheresberg 2013). Moreover, one in three students reported that their financial situation was “somewhat likely” to “likely” to affect their ability to complete their undergraduate degree (Lyons 2007). Furthermore, students are not opposed to financial-literacy courses, as studies indicate they positively affirm their desire to participate in financial-management seminars at the university level (Cude et al. 2006). This unmet need is important to fill, as financial burden is one of the leading predictors of poor university performance (Harding 2011; Triventi 2014), and is inversely associated with mental well-being in university-age students (Andrews & Wilding, 2004). The negative implications of poor financial planning are further compounded by the recent trend of slow economic growth in the US (Fernald 2016), record-high tuition rates resulting in more student-loan burden (Joo, Durband & Grable 2008) and deceptively “easy” credit (credit cards) leading to high debt and interest payments (Mae 2002). The need to improve undergraduate financial knowledge motivated its inclusion within Life101.

Nutritional and physical well-being

Life101 also focused on nutritional and physical well-being. Over one-third of US young adults are obese (Ogden, Carroll, Fryar & Flegal 2015), increasing their risk for hypertension, cardiovascular disease, Type II diabetes and multiple forms of cancer (Basciano, Federico & Adeli 2005; Goel 2015; Pereira 2006; Stanhope et al. 2009), coupled with decreased quality of life (Swallen, Reither, Haas & Meier 2005). A major contributing factor is limited awareness about the detrimental health outcomes of added sugar to food and beverages; this is especially the case for young adults, who are the largest consumers (Ogden, Kit, Carroll & Park 2011). Therefore, educating university students about the negatives of increased sugar consumption may alleviate excess weight-gain and reduce adverse long-term health consequences.

Additionally, physical activity dramatically declines upon university entrance. Undergraduate students show a significant decrease in physical activity compared to high-school students, with only 57% participating in moderate to vigorous physical activity, compared to 91% of high-school students (Nelson, Gortmaker, Subramanian & Wechsler 2007). The decline in undergraduate physical activity is partially due to students no longer having to fulfill a mandatory physical-education requirement (Stults-Kolehmainen & Sinha 2014). Thus, many first-year undergraduates lose not only the physical benefits but also the positive mental-health benefits gained from exercise (Cotman, Berchtold & Christie 2007; Gerber et al., 2014).

Methodology

Life101 course

Life101 was developed to fill an unmet need among undergraduate students nationwide: high rates of stress with limited self-coping mechanisms and decreasing access to university health services

(American College Health Association 2012; Castillo & Schwartz 2013; Koch 2016). The course aimed to provide students with tools to self-activate their own “stress-release valves”, and to ultimately enable them to improve their health and achieve their academic goals. Student-led discussions and informal surveys provided the basis for the 10 topics chosen and presented in this course (Table 1). The course was offered in-class and online during the Winter and Summer quarters, respectively, for a period of 10 weeks for one hour per week. The online version of the course had the same content as the in-class version, and was delivered through video recordings of the in-class material presented by the same instructor. The videos were presented in 10-minute sections separated by a multiple-choice question based on the content of that section. For the online version, in-class discussions were replaced with online forums using the web platform *Canvas*. Students answered weekly questions and participated in weekly discussions with the instructor, teaching assistants and classmates. Each class meeting presented two to three practical concepts related to the topic, and students were encouraged to adopt them.

Table 1. Topics covered in online and in-class Life101 sessions

Week	Topic	Week	Topic
1	Changing Bad Behaviors and Habits [the science of behavioural changes]	6	Move and Exercise [short-term and long-term mental and physical benefits of exercising]
2	Stress [etiology, physiology and pathology]	7	Emotional Intelligence [comparing IQ and EI in relation to success and wellness]
3	Stress Management	8	Volunteering and Mindful Service [health benefits of mindful volunteering]
4	Nutrition Dos and Don'ts [mindful eating]	9	Money Management [personal finances for university students]
5	Bad Drugs on College Campuses [energy drinks, Ritalin, Adderall and sedatives]	10	Social Responsibilities [feeling good by becoming socially responsible]

Pre- and post-course surveys

A retrospective analysis of pre- and post-course anonymous surveys was employed to assess the effectiveness of Life101. The survey was developed by the course instructor based on the topics covered in the course. The same survey was used for the in-class and online versions. Students received the same survey before the start of the class (week 1) and after completing the class (week 10), and completion of the surveys was mandatory. The surveys were designed to evaluate behavioural changes that could have resulted from improvements in motivation, stress management, exercise, personal finance, emotional intelligence and nutrition. Percentage changes were the difference between the students' choices of YES and NO in the pre-course and post-course survey(s). Students could provide open-ended feedback in the comments section of the survey. This served two purposes: the ability to adjust course topics if enough students indicated a shared theme and to collect student suggestions for improving the delivery and content of future courses. Additionally, at the end of each course, students completed a university-mandated course evaluation, required of all courses (online and in-class) offered at UCI. The course evaluations measured faculty teaching and enabled students to give an overall course grade on the scale of 0-4.

Analysis

Survey responses from students of each class cohort were combined to determine the statistical significance of the effectiveness ratings for Life101. Descriptive statistical analyses were conducted using Prism software Version 5.0 (GraphPad, La Jolla, CA). The pre-course and post-course values for each question from online and in-class groups were compared using the chi-square test (Tables 2 and 3).

Results

Student demographics

Of the 1,269 students who took this course either online (851 students) or in-class (418 students), 87% were completing bachelor of science degrees, with a female-to-male ratio of 64% to 36% for online sessions and 66% to 34% for in-class sessions. Dropout rates for both the in-class and online courses were less than 1%. Although the course is open to all majors, it is a required course for pharmaceutical-sciences majors at UCI. The majority of these students are pre-pharmacy majors, as UCI is one of the leading undergraduate “feeder” programs to post-secondary pharmaceutical-sciences programs and pharmacy schools (Pharmacy College Application Service, 2015). Consequently, pharmaceutical-sciences students accounted for 74% of the students in the in-class version and 56% of the students in the online version, followed by biological sciences (10% for both in-class and online versions). Other majors (e.g., public health, psychology, business, engineering, economics, etc.) represented between 5 and 10% for both online and in-class sessions. The majority of pharmaceutical-sciences and biological-sciences students at UCI apply to health-care graduate schools (e.g., schools of pharmacy, medicine, dentistry and nursing). Therefore, the majority of the students (90% of in-class and 72% of online) who took Life101 were pre-health majors.

Comparison of pre- and post-course surveys from in-class and online Life101 courses

The combined results from four online Life101 sessions revealed statistically significant differences between pre- and post-course survey responses. After taking Life101, students reported 14% and 23% gains in being successful in making positive lifestyle changes in the in-class and online versions of the course respectively (62% to 76% in the in-class and 61% to 85% in the online). The improvements in positive lifestyle choices were reflected in exercising more, eating healthier by avoiding eating refined sugar and eating a well-balanced diet, managing their personal finances better and feeling less stressed through application of de-stressing methods presented in the class, such as regular sleep hours, outdoor activities, mindful volunteering and exercising (Table 2).

One of the most significant changes in the pre- and post-course surveys for both in-class and online versions was students’ level of understanding of EI and how to improve it. Students reported 54% and 67% improvements in understanding and improving their EI for the online and in-class versions of Life101, respectively (Table 2).

Table 2. Percentage of Life 101 students who answered YES to pre- and post-course survey questions

Parameter/Question	Course Type	Pre-Life101 [†]	Post-Life10 [†]	Percent Change	P value [§]
I am successful in making positive lifestyle changes.	Online	61.4 ± 6.1	84.6 ± 3.6	+23.1	< 0.0001
	In-class	62.5 ± 5.2	75.5 ± 4.2	+13.1	< 0.0001
I exercise/move, moderately intensely, at least 30 minutes three days a week.	Online	48.4 ± 5.8	66.1 ± 1.6	+17.7	< 0.0001
	In-class	42.2 ± 3.9	52.1 ± 2.1	+9.9	0.0036
I pay attention to my personal finances regularly and know how to manage them.	Online	67.5 ± 6.1	85.5 ± 0.8	+18.0	< 0.0001
	In-class	66.3 ± 4.1	71.9 ± 3.4	+5.7	0.0723
I feel stressed most of the time.	Online	62.4 ± 2.1	47.0 ± 2.3	-15.5	< 0.0001
	In-class	76.3 ± 9.1	70.0 ± 6.9	-6.4	0.0352
I know how to de-stress.	Online	66.8 ± 1.6	92.9 ± 1.5	+26.2	< 0.0001
	In-class	74.5 ± 3.1	89.0 ± 0.7	+15.9	< 0.0001
I know what emotional intelligence is.	Online	43.3 ± 5.1	97.3 ± 0.7	+54.0	< 0.0001
	In-class	29.7 ± 1.5	96.6 ± 2.5	-66.9	< 0.0001
I'm happy about where I am in life.	Online	57.8 ± 6.4	74.3 ± 3.7	+16.5	< 0.0001
	In-class	63.2 ± 2.0	67.7 ± 4.3	+4.5	0.1671
I avoid refined sugar.	Online	42.4 ± 3.3	62.4 ± 1.9	+20.0	< 0.0001
	In-class	32.2 ± 2.6	45.6 ± 4.1	+13.4	< 0.0001
I make an effort to eat a healthy, well-balanced diet.	Online	59.3 ± 8.4	73.0 ± 3.7	+13.7	< 0.0001
	In-class	31.4 ± 4.9	44.4 ± 5.3	+13.0	0.0001

[†]Data presented as mean ± s.e.m.

[§]P values were calculated using the chi-square test.

Course evaluations

Students completed an overall course evaluation survey, in which they assigned two overall scores for the course and instructor. The scoring scale was from 4 (highest) to 0 (lowest). The combined average course score, for both in-class and online iterations, was 3.90/4.0, and the average score for the instructor was 3.93/4.0.

Comparison of online versus in-class improvements from Life101 courses

As each course format (online and in-class) showed significant improvements, it was important to determine if the gains were significantly different depending on the course format. Survey responses from all cohorts of the online courses were compared to those from all cohorts of the in-class responses. Compared to in-class students, online students indicated better financial management (18% vs. 5.7%), improved self-reported feelings of decreased stress (15.48% vs. 6.36%) and increased happiness in their present lives (16.48% vs. 4.54%). Interestingly, in-class students showed greater gains in their understanding of emotional intelligence (66.93% vs.

54.01%). The improvements in exercise, nutrition and methods to de-stress were not significantly different between the two course formats (Table 3).

Table 3. Comparison of percent change ($\Delta\%$)[†] in YES answers between pre- and post-course surveys of students who took Life101 online and in-class

Parameter/Question	Online [†]	In-Class [†]	P value [§]
I am successful in making positive lifestyle changes.	23.1	13.1	0.1988
I exercise/move, moderately intensely, at least 30 minutes three days a week.	17.7	9.9	0.3787
I pay attention to my personal finances regularly and know how to manage them.	18.0	5.7	0.0400
I feel stressed most of the time.	15.5	6.4	0.0091
I know how to de-stress.	26.2	15.9	0.0600
I know what emotional intelligence is.	54.0	66.9	0.0004
I am happy about where I am in life.	16.5	4.5	0.0145
I avoid refined sugar.	20.0	13.4	0.6848
I make an effort to eat a healthy, well-balanced diet.	13.7	13.0	0.2547

[†]Percent change was the difference in students who answered YES to pre-course and post-course survey questions, enabling comparison between the online and in-class students.

[†]Data presented as mean values.

[§]P values were calculated using the chi-square test.

One-year follow-up of pre- and post-course surveys from in-class Life101

To determine whether the lifestyle improvements experienced by Life101 students were durable, students who had taken the in-class version of Life101 in Winter 2014 were asked to respond to the same survey administered one year after completion of the course. In four of the areas, students reported an increase in positive responses relative to the end of the course, including exercise (50% to 71%), understanding of emotional intelligence (31% to 96%), avoidance of eating refined sugar (30% to 52%) and efforts to eat a healthy diet (22% to 40%). There were no significant further changes in students' positive responses for managing personal finances, levels of stress and happiness in life (Table 4).

Table 4. Percentage of students who took Life101 in-class and answered YES to the one-year post-course survey questions

Parameter/Question	Post Life101 [†]	One-Year Follow-Up [†]	Percent Change	P value [§]
I am successful in making positive lifestyle changes.	68.9	51.2	-17.7	0.0011
I exercise/move, moderately intensely, at least 30 minutes three days a week.	50.0	71.0	+21.0	< 0.0001
I pay attention to my personal finances regularly and know how to manage them.	61.9	67.0	+5.1	0.2996
I feel stressed most of the time.	80.5	71.0	-9.5	0.397
I know what emotional intelligence is.	30.5	96.0	+65.5	< 0.0001
I am happy about where I am in life.	67.0	71.0	+4.1	0.4742
I avoid refined sugar.	29.7	52.0	+22.3	< 0.0001
I make an effort to eat a healthy, well-balanced diet.	22.0	40.0	+18.0	0.0003

[†]Data represents the percentage of students who answered YES to the survey questions.

[§]P values were calculated using the chi-square test.

Discussion

The stress epidemic among university students is growing exponentially (Pryor, Hurtado, DeAngelo, Blake & Tran 2010). Chronic stress can result in social isolation, loneliness and depression, all of which can dampen student academic achievement (Merianos, Nabors, Vidourek & King 2013). However, research on effective and relatively low-cost and easy-to-implement solutions to this problem is limited, making it increasingly difficult for effective implementation of such solutions on university campuses. Earlier studies assessing effective modalities for stress management were either short-term (four to eight sessions) (Dehghan-Nayeri & Adib-Hajbaghery 2011; Gaab, Sonderegger, Scherrer & Ehlert 2006), and/or had limited student enrollment (Conley, Durlak & Kirsch 2015; Lynch, Gander, Kohls, Kudielka & Walach 2011). However, even with limited sample size and duration, stress-management interventions appear to result in positive changes. For example, following a seven-week stress-management and mindfulness course, undergraduate nursing students reported an improved sense of well-being (van der Riet, Rossiter, Kirby, Dluzewska & Harmon 2015). A similar outcome arose in undergraduate pre-nursing students following an eight-week mindfulness-based course in stress reduction (Beddoe & Murphy 2004).

A major limitation of present stress-reduction interventions is the narrow focus of techniques taught, such as mindfulness or anxiety-coping skills. In contrast, Life101 covers a wide array of topics to ensure that students have control over multiple possible sources of stress. This makes Life101 a potential behavioural-intervention course because of the benefits gained by a large cohort of undergraduates, the course's malleable structure, and the ease of implementation on other campuses.

The need for healthy stress management is evident within the highly competitive fields of the health sciences (Farabaugh et al. 2012). Since the stress burden does not decrease as pre-health students transition into medical, pharmacy or nursing schools (Frick 2011; Warnecke, Quinn, Ogden, Towle & Nelson 2011; Watling 2015), the importance of teaching these undergraduate students stress-management skills, such as those presented in Life101, becomes even more crucial to ensure their personal and professional success.

High levels of EI are associated with lower levels of stress, especially in health-care professionals (Ruiz Aranda, Extremera & Pineda Galán 2014). As the majority of students enrolled in Life101 were pre-health majors, it was critical that these students understand what EI is and learn how to improve it. It is possible that improving the students' EI equipped them to gauge their stress level and to manage it more efficiently. The outcomes reported here are similar to earlier EI intervention studies. In a study conducted among undergraduate nursing students, increased understanding of EI following a four-week intervention program reduced their stress level (Lee & Gu 2014). Similar improvements arose following a counsellor-led EI training intervention (Pearson & Weinberg 2016). Thus the positive benefits from the inclusion of EI in Life101 further confirm prior studies, providing additional evidence for its beneficial impact.

Personal financial management was also covered in Life101. According to the College Stress and Mental Health poll, 67% of students reported feeling stressed about financial worries (Press 2009), with university loans as one of the central sources (Serido, Shim, Xiao, Tang & Card 2014). The

outstanding student loan debt currently exceeds \$1.2 trillion, and the associated stress affects individuals not only during university, but also after graduation (Sweet, Nandi, Adam & McDade 2013), and negatively affects students' psychological function and mental health (Walsemann, Gee & Gentile 2015). Given that the financial decisions students make at university can have long-term socioeconomic consequences, it is important to provide them with money-management skills. To address this gap, fiscal-management strategies were included within Life101. This was important as early exposure to financial knowledge lowers long-term risky financial decisions (accumulated credit-card debit, paying the minimum credit-card balance) compared to those exposed later in their time as undergraduates (Xiao, Ahn, Serido & Shim 2014). The inclusion of fiscal management in Life101 not only improved students' understanding of complex financial concepts, but may have positive long-term repercussions.

Poor nutrition and an increasingly sedentary lifestyle contribute to university students' stress. Poor nutrition choices often go hand in hand with lack of exercise and serve to augment growing health concerns on university campuses. Between busy class schedules, often unhealthy dining-hall food choices, poor time management and lack of exercise, undergraduate students gain, on average, nine pounds (four kilograms) between the start of university and the end of their second year (Racette, Deusinger, Strube, Highstein & Deusinger 2005). Approximately 40 to 50% of university-age students choose to forgo exercise, partly because it takes time away from their academic endeavors (Keating, Guan, Piñero & Bridges 2005). Yet, by decreasing or eliminating exercise, they not only jeopardise their physical health, but increase their risk for mood- and stress-related disorders (Becofsky et al. 2015). Active individuals show higher levels of alertness, concentration, creative thinking and cognitive function (Loprinzi & Kane 2015; Oppezzo & Schwartz 2014), all of which are important for academic success. The incorporation of physical and nutritional well-being topics in Life101 increased students' reported level of exercise and improved nutritional health.

A unique finding was the difference between online and in-class improvements. Students who took the course online reported significantly greater improvement in the areas of financial management, stress recognition and management and student happiness with their present lives. However, student understanding about emotional intelligence and its benefits was greater for those who took the in-class version of the course. These differences in student outcomes due to the learning environment may highlight a growing trend for the preferred learning style of millennial undergraduates. Indeed, online education platforms are these students' growing preference: they want not only to control the type of education they receive, but also where, how and when they receive it (Carlson 2005; Sweeney 2006). Hence, not surprisingly, some of the highest users of online platforms are on-campus students (Mann & Henneberry 2012). Further spurring this trend is the growing tendency for universities to provide online courses to stave off rising costs (Hersh & Merrow 2015). Yet the benefits gained from online courses are highly dependent upon the type of interactions available for students: online learning environments that promote an online community, mediated through discussion questions and instructor interaction, indicate knowledge retention at the same level as, or greater than, in-class learning environments (Bowen, Chingos, Lack & Nygren 2014; Salmon 2013). Life101 facilitates this type of online platform, since students partake in online posts and discussions, and the instructor's presence and interaction with students promotes the "connectivity" of an online course community.

A highly relevant finding from our observations is the early evidence for the continued gains by students who participated in Life101. One year following the completion of the course, students reported continued gains in areas such as exercising, understanding of emotional intelligence and adopting healthy nutrition. These outcomes are relevant, as the majority of studies of student well-

being report short-term results and are limited in their provision of longer follow-up data (Regehr, Glancy & Pitts 2013). These long-term observations highlight the continued benefits Life101 affords students, and further emphasise its potential impact on students' improved stress management.

Limitations

The main limitation of this work is its observational and retrospective nature, which resulted in its use of static time points of assessment. This is not a prospective and in-depth pedagogical educational study. The instructor designed and piloted a survey that was administered before and after the course to provide her with pilot data on the effectiveness of the course and to assist her in modifying the course content. Ideally, data collection in future, prospectively planned studies will be continuous, mediated by “experience sampling” implemented through a cellular phone application, enabling the repeated, context-sensitive measurement of emotion and behaviour (Conner, Tennen, Fleeson & Barrett 2009). This will provide real-time feedback on the benefits gained from the course.

Additionally, due to the continual evolution of this course, future surveys will likely undergo modification to allow better understanding of the differences between learning in the in-class and online versions of this course. Though the present study explores potential explanations, further pedagogical in-depth study design and analysis is necessary to comprehend fully why there were differences between the two versions of this course.

Lastly, it is important to highlight another limitation: the one-year follow-up data was derived from only a single in-class cohort (Winter 2014). To elucidate the long-term benefits gained from student participation in Life101, surveys should be conducted from multiple cohorts, among students who took both online and in-class courses.

Conclusion and future implications

Lifestyle courses for students may lead to long-lasting behavioural changes, increased personal and professional success, decreased dropout rates and reduced on-campus and off-campus health-care costs by lowering lifestyle-related diseases. A campus-wide inclusive discussion between student-advocacy groups, faculty members and administrators is crucial in bringing courses like Life101 to undergraduate campuses. Although in this work we are reporting preliminary observations in a retrospective manner, we are in the process of designing and developing a more in-depth pedagogical educational research study to prospectively evaluate the impact of this course on our students' mental and physical health. We believe this grass-roots dialogue on University of California campuses will help spur a nationwide awareness of the need for lifestyle intervention courses on all university campuses within the US.

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