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ABSTRACT

Fostering deep and meaningful self-reflection that leads to action, growth, and personal change among students challenges professors of large classes. Over 280 students in a single lecture course on critical thinking were asked to take part in a self-analysis and also were provided multisource (360°) feedback. The combination of personalized feedback from the self and from known others appears to facilitate processes related to self-insight and developmental goal setting. This pedagogical approach would not have been possible without the development of software integrating WordPress, a popular, free, open-source content management system (CMS), with Qualtrics, an online survey tool. This paper describes how this technology served both as a pedagogical tool, as well as a research tool.

Keywords

Pedagogy, 360° feedback, open-source, CMS, sustainability, reflection, motivation

INTRODUCTION

While a great deal of innovation has taken place, much of the technology used in university classrooms still fails to live up to the vision established by Leidner and Jarvenpaa in 1995 when they observed:

> Our analysis suggests that initial attempts to bring information technology to management education follow a classic story of automating rather than transforming. IT is primarily used to automate the information delivery function in classrooms. In the absence of fundamental changes to the teaching and learning process, such classrooms may do little but speed up ineffective processes and methods of teaching. (p265)

Indeed, many blame technology for a perceived general decline in the academic performance of students. Recent books implicate the Internet in students' failure to develop higher-order thinking skills, and in encouraging shallow approaches to interpreting the world (Arum & Roksa, 2011; Carr, 2010). Other studies indicate that narrowly-focused assignments that concentrate students' attention on extrinsic rewards, e.g. grades, interfere with cognitive ability and sap student motivation for learning (Deci, Koestner, & Ryan, 1999; Kohn, 1999; Pink, 2010). Examination of current learning management systems (LMS)—from commercial systems such as Blackboard, to open-source systems such as Moodle—indicates that the primary function of these tools is to deliver content and quizzes online, and to provide the class with an online gradebook. It remains important to ask how technology can work in support of learning and not against it.

Course size remains an issue. Particularly in the context of the global recession, budget cutting pushes academia towards ways to handle a growing student population with the same or even fewer instructors. While technology is certainly an obvious candidate for enabling the effective management of learning in large classes, much care needs to be given to the means by which this is accomplished. In particular, with large sections, it is difficult for an instructor to provide rich feedback and careful guidance that meets the needs of the individuals in the classrooms—people from diverse backgrounds, with different life trajectories, strengths, needs, and interests. Helping students make sense of their lives is a task that requires of students a great deal of self-reflection, and timely, tailored feedback from instructors. This can be a daunting task for instructors who may teach hundreds of students per term.

This paper describes Personality Pad, a website whose goal is to foster intentional self-development in the area of personal sustainability. Personality Pad automates the process of 360° evaluation, also known as multi-source feedback, allowing an individual to guide a large number of people through a process of self-discovery and personal growth. Multi-source (360°) evaluation will be described, followed by a description of the tool's development. Following that, the paper presents a study conducted using the tool along with preliminary results. The implications of Personality Pad for research and pedagogy are discussed followed by a discussion of the limitations of the tool and pedagogy, as well as next steps.

360° FEEDBACK

Multi-source feedback, also known as 360° evaluation, is a performance appraisal technique, typically used in business and professional settings, in which a person being evaluated receives assessment of performance from self, colleagues, superiors, subordinates, and other key informants. This feedback is then combined to support the creation of a personal development plan. Research has consistently shown that, when conducted effectively, the multi-source feedback process can lead to greater evaluative accuracy and higher levels of participant acceptance compared to single source evaluation alone (London & Smither, 1995). It is also more likely to increase motivation and lead to specific developmental actions (Bono & Colbert, 2005). While fairly well known in professional environments, it has not been employed to a great extent in academic settings. Such evaluations are frequently conducted for companies by consulting firms that charge considerable sums for the service. The authors of this study are not aware of any applications of this feedback approach in academic settings.

360° evaluation offers a number of opportunities and challenges in an academic setting. To start, manager and co-worker feedback would be substituted with peer, friend, and family-evaluation. While peer-evaluation already forms a part of many college course syllabi, 360° evaluation adds certain elements that do not exist in most peer-evaluation scenarios. For one, a student will be able to compare self-ratings to the aggregate ratings provided by the peer group. Furthermore, the student would be able to compare those ratings to the aggregate ratings received by peers. In other words, the student would get information about how he or she perceives himself/herself, side-by-side with information about peers' opinions, side-by-side with how peers rated themselves. Also, students are asked to not only provide an evaluation of their current performance on a task, but also an ideal estimation of how the student would ideally like to perform.

Clearly, the logistics of providing such a process, especially for large classes, are non-trivial. The next section describes a software tool that was developed to handle these logistics.

THE PLUGIN

WordPress (http://www.wordpress.org) is a free, open-source, content management system (CMS) built on the popular LAMP (Linux-Apache-MySQL-PHP) stack. It began in 2003 and has evolved into a platform equally suitable for personal blogs and Fortune 500 company websites. The WordPress core focuses on scalability, security, and ease of management while enabling extensibility with a mature, robust architecture designed to support user-defined functionality through plugins, and high-quality user experiences through themes. A large, active, and responsive developer community supports creation of new functionality. For novices, no longer does one need to be a web developer to build and maintain a professional internet presence. For developers, no longer does one need to waste time reinventing the basic architecture required by every website—development effort can instead be spent on developing the functionality that will make a website suitable to meet the needs of each unique situation. Because of the needs of the Personality Pad project, WordPress was an ideal choice as a development platform.

Personality Pad integrated 360° feedback into a WordPress website using another web-based tool, Qualtrics (http://www.qualtrics.com). Qualtrics is an online survey generation, delivery, and analysis tool. It has a robust REST API that allows developers to incorporate survey results into a website in real time. Qualtrics provides a subscription-based service to which the researchers had access via their university account. Use of Qualtrics enabled a number of key functionalities including automatic scoring of participants' surveys, automatic generation of survey panels, and management of email distribution of the surveys. Qualtrics kept track of participation rates, actual time participants spent on the surveys, and other metadata useful to both the pedagogy and research being conducted. The interface that was developed will now be described.
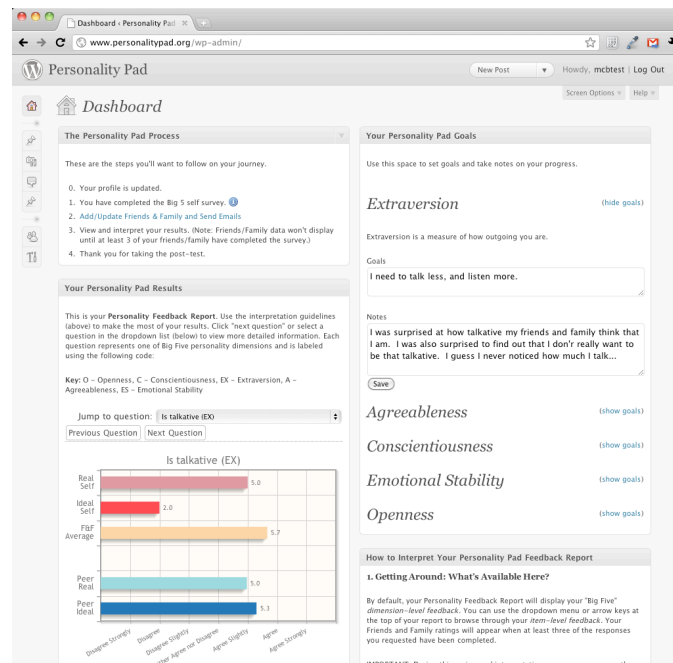
**Figure 1. A Screenshot of the
Personality Pad Dashboard**

Figure 1 shows a screenshot of the Personality Pad dashboard. The dashboard displayed four "widgets": The Personality Pad Process (Figure 2), Your Personality Pad Results (**Error! Reference source not found.**), Your Personality Pad Goals (Figure 5), and How to Interpret Your Personality Pad Feedback Report (Figure 6). When students originally logged into the Personality pad website, only the process widget was visible. After they completed their first survey, the results widget was displayed, although this widget did not display feedback from friends and family until at least three friends/family had responded, and then it displayed aggregate feedback. Once friends/family data was available, the goals and interpretation widgets became available.
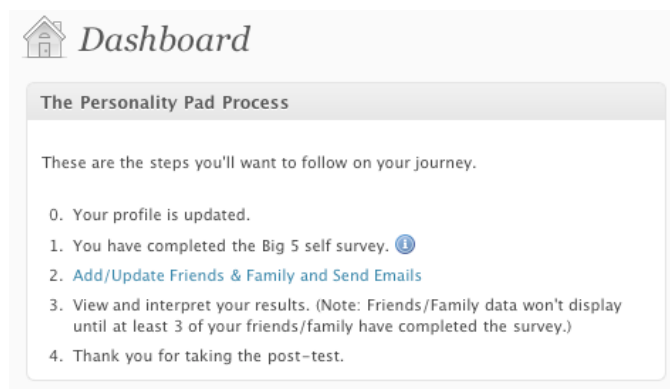

**Figure 2. The Process Students Followed
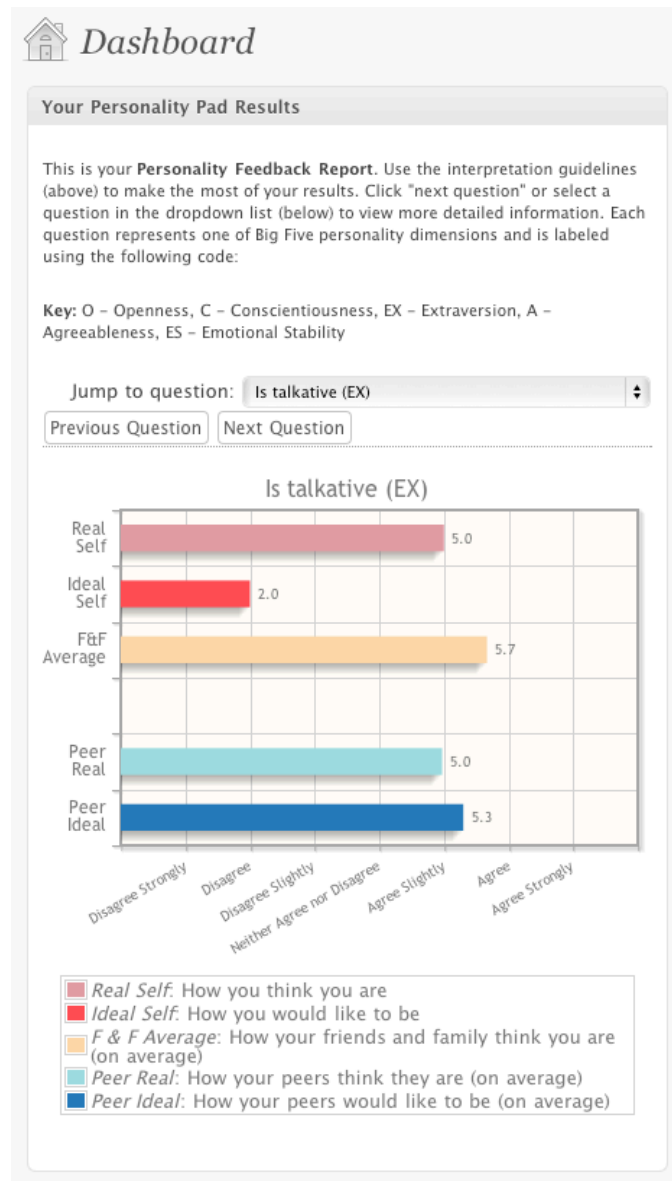in Personality Pad**

Figure 3. An Example of 360° Feedback
Participants Received

Two developers spent approximately two months developing the plugin. The bar charts in the results widget were generated client-side using a jQuery charting library. The plugin was tested in all major browsers, and while performance in Internet Explorer is significantly poorer, it is functional in all of them. Future versions of the plugin would do better to generate the charts server-side using a PHP charting library, in an environment free of browser-based quirks and restrictions, rather than client-side with javascript, as was done in this case. While the current version of the plugin is tailored to the specific survey used in this study, it would be straightforward to adapt the plugin for use with other surveys. The next version of the plugin will make it easier to use an arbitrarily selected survey as the subject for the 360° feedback.

THE STUDY

The primary participants in this study were 280 students in a freshman-level course on critical thinking focusing on 1) a conceptual and practical understanding of thinking and reasoning, 2) applied thinking and problem solving skills, 3) liberal practice in the methodologies taught, and 4) assessment and evaluation of results. Participants were students at a mid-sized public liberal-arts university.

**Figure 5. An Example of Students'
Notes and Goal-Setting**

Study Theme: Sustainability

The thematic focus for the course was sustainability, which was defined as:

A society possessing the ability to continue to survive and prosper, not just with respect to environmental resources and economic development, but also with respect to quality of life as it pertains to conditions that promote sustainable human prosperity and growth (e.g., opportunity, economy, privacy, diversity, community, the arts, education, and health). A sustainable society meets these needs simultaneously, and in the context of human respect and the ability to negotiate differences without violence.

While during the course this definition of sustainability was applied in five contexts—environmental, socio-cultural, economic, technical and individual—the study focused on the last of these, individual sustainability, described as:

> *A person's ability to live a lifestyle that includes creating harmony, interconnection, and relatively high levels of awareness in one's values, thoughts, and behaviors as well as maintaining an increasing control over one's physical, emotional, social, philosophical/spiritual, and intellectual life.*

Fostering, let alone monitoring, deep critical reflection among 280 students on their personal sustainability was a daunting pedagogical task. To do this, Personality Pad was used in conjunction with the Big Five psychology personality test to encourage students to reflect upon aspects of their personalities that were more or less sustainable.
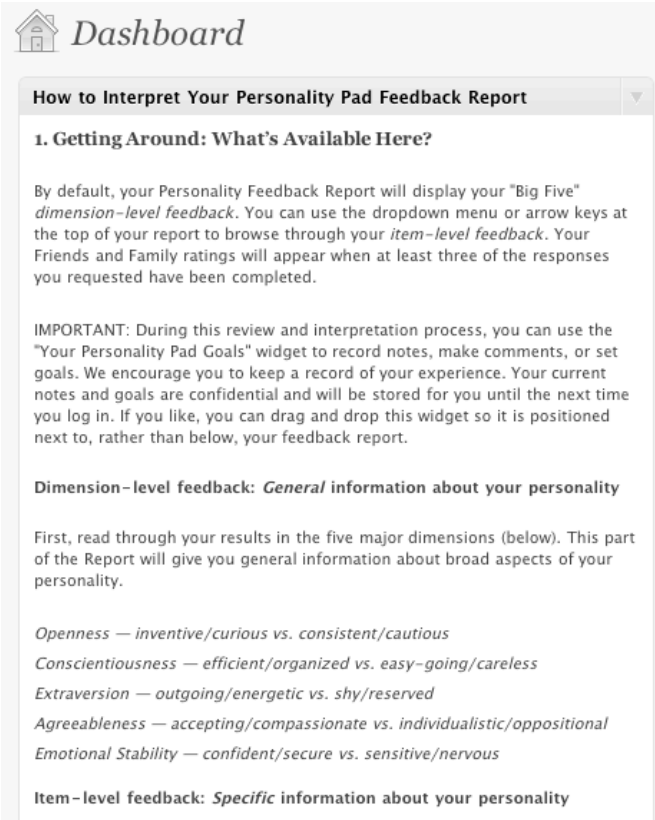
**Figure 6. Guidance Participants Were
Given Along the Way**

The Big Five Personality Test and Multi-Source Feedback

The Big Five Inventory (BFI) is a 44-item self-report survey that scores inventory takers on elements of the "Big Five" factors, or Five Factor Model (FFM) personality traits: openness, conscientiousness, extraversion, agreeableness, and neuroticism (aka emotional stability) (John, Donahue, & Kentle, 1991). These five factors were discovered, empirically measured, and have been found to be robust across many studies (Digman, 1990). Briefly described:

Openness: Intellectual curiosity, appreciation for novelty, unusual ideas; inventive/curious vs. consistent/cautious

Conscientiousness: Self-discipline, achievement-orientation; efficient/organized vs. easy-going/careless

Extraversion: Outgoingness, seeks energy from the company of others; outgoing/energetic vs. solitary/reserved

Agreeableness: Compassion, cooperativeness; friendly/compassionate vs. cold/unkind

Neuroticism: Prone to negative emotions, depression, anger, vulnerability; sensitive/nervous vs. secure/confident

Students were provided with a link to the Personality Pad website, and asked to register for an account. Upon logging in they were presented with a link to take the Big Five survey (see Figure 2). The version of the survey they were presented contained 88 questions rather than the normal 44. This is because each participant was asked to take the Big Five survey twice: once assessing themselves as they currently were, and once assessing themselves as they would ideally like to be. This allowed them to see scores contrasting their "real selves" with their "ideal selves."

Next, participants were asked to provide the names and email addresses of five friends/family. These people received a link to the Big Five survey along with instructions asking them to complete the survey about the participant who had sent them the survey. Participants were free to send the survey to as many friends/family as they chose, but they were not allowed to see the results of these surveys until at least three of the friends/family had responded. This was done to ensure some level of privacy/anonymity to the friends/family who responded. Only the aggregate scores from friends/family were presented to the

participants. Also, upon completing the assessment of the participant, friends/family were directed to an invitation to participate in the Personality Pad experience themselves.

Once at least three of the friends/family had responded, participants were allowed to view their results (see Figure 3) alongside of which they were given guidelines for interpreting the results (see Figure 6). Results presented the aggregate scores on each of the five factor traits for their "real selves," "ideal selves," friends/family scores, and also presented the aggregate "real" and "ideal" scores of the other participants in the study for peer-group comparison. The interpretation instructions also encouraged them to note their reactions to the results of the surveys and set personal change goals (see Figure 5). In particular, participants were encouraged to interpret their results in light of how sustainable they were over the long term, i.e. for the rest of their lives. The contrast between real and ideal scores was expected to trigger reflection on the gap between participants' values and their actual behaviors.

In addition to the Big Five survey, participants also took short pre- and post-tests in which they were asked questions that sought to gauge their attitudes toward and motivation to engage in self-improvement.

RESULTS

In total, 273 participants completed the pre-test and the Big Five survey; 638 friends/family responded to the invitation from participants to rate them; 243 participants completed the post-test. For this paper, the most salient results are from the pre- and post-tests. Respondents were mostly college freshmen from a wide variety of majors at a medium-sized, public southern university. Results are summarized in Table 1 and Table 2. The entire study duration was about three weeks.

The results presented here represent descriptive analyses of the responses given by participants on the pre- and post-tests. The results of the actual personality test are not presented here, as they do not relate directly to the efficacy of the tool for use in pedagogical settings. Also, due to space constraints, a correlational analysis that breaks the respondents into sub-groups and looks at the likelihood of certain post-test responses based on pre-test answers is not included. That being said, preliminary analysis of the correlational data indicates some significant and interesting results with respect to differences between the groups of participants who did and did not receive feedback from friends/family. Such analyses will be presented in upcoming publications.

On the pre-test, the results can be broken down into several categories: desire for self-knowledge, motivation to change, a sense of self-efficacy in their ability to change, and perceptions of the extent that they know what self/others know about them and whether or not they believe this feedback. A majority of participants indicated that self-knowledge was important to them (95%) and that they basically understand themselves (73%), although nearly a third indicated there were aspects of their selves that they would rather not know about (29%). Likewise, reaching their full potential and improving them selves was important to them, but they offered conflicting responses on whether they are satisfied with who they are now. When asked to rate their agreement with the statement, "I am satisfied with the person I am now," 75% agreed. However, to the statement, "I don't think about self-improvement because I'm satisfied with the person I am," 85% disagreed. As for their ability to change, a smaller majority (66%) believes that a person's personality can change in their adult life, while nearly a quarter (24%) doubt that such change is possible. That being said, 82% agreed with the statement, "I can change parts of my personality if I want to," even though only 52% report having had some success in personal change. While they are not always aware of what friends/family think of them (47% agreed they know), they overwhelmingly say that they care and trust what friends/family think (93% and 83% respectively).

On the post-test respondents were asked how they felt about the experience, how much they thought they learned, how likely they thought they were to attempt change, and to what types of feedback they gave the most weight in their self-analysis. Most reported that the experience was enjoyable. Participants were asked, "In one word, how did you feel after you reviewed your personality feedback report?" Responses were coded into five categories: enlightened, motivated, positive, neutral, negative. The majority of the responses fell into the first three categories, with only 12 respondents (<5%) giving a negative rating. Over three quarters (76%) reported learning something new about themselves. Many indicated that reviewing this type of information periodically would be productive (90%), and that they would like to use more Personality Pad tools as they became available (63%). Again over three-quarters (76%) indicated that participation led them to personal changes that they would like to make. Interestingly, respondents who received feedback from friends/family indicated 2-1 that the feedback they received from friends/family was a more accurate depiction of their "true personality" than their own responses.

Fewer than 5% of the study participants reported having technical trouble using the tool (approximately 13 out of over 280). Records were kept as to how these individuals used the tools (what web browser, from what network location, etc.) to allow any potential technical bugs in the tool to be corrected.

DISCUSSION

In general, multi-source feedback has four primary aims: engagement, self-insight, motivation, and personal change. These aims map very well to the educational aims of instructors in a university classroom. Understanding oneself and making productive personal changes are difficult but rewarding tasks. The results of initial attempts to use an online multisource feedback platform to motivate students to engage in self-insight, personal goal setting, and intentional self-development in a large class setting are encouraging. Findings suggest that a majority of students, after interpreting their 360° personality feedback, report having a greater understanding of their personality, in some cases leading to actionable plans to implement personal development. This project demonstrates that multi-source type of feedback triggers interesting behaviors that lead toward greater self-awareness and personal growth.

The picture of college freshmen that emerges from the descriptive results resonates with descriptions of the generation alternatively described as "Generation Y," "Millennials," and "Generation Me" (Eubanks, 2006). There is reason to believe that the pedagogical approach encapsulated in Personality Pad may be especially effective with this demographic since it

Questions	Strongly Disagree	Disagree	Slightly Disagree	Neither Agree nor Disagree	Slightly Agree	Agree	Strongly Agree
The pursuit of self-knowledge is important to me.	1(0%)	0(0%)	2(1%)	7(2%)	40(14%)	113(45%)	112(38%)
There are some parts of myself that I would rather not know about.	29(10%)	67(23%)	55(19%)	55(19%)	57(19%)	23(8%)	7(2%)
I understand myself.	2(1%)	8(3%)	35(12%)	32(11%)	101(34%)	103(35%)	13(4%)
The pursuit of self-improvement is important to me.	0(0%)	1(0%)	0(0%)	10(3%)	65(22%)	149(51%)	69(23%)
Trying to reach my full potential is important to me.	0(0%)	0(0%)	0(0%)	1(0%)	19(6%)	117(40%)	158(54%)
I am satisfied with the person I am now.	1(0%)	16(5%)	33(11%)	23(8%)	100(34%)	109(37%)	13(4%)
I spend a lot of time thinking about the kind of person I am.	0(0%)	6(2%)	9(3%)	34(12%)	92(31%)	110(37%)	44(15%)
I don't think about self-improvement because I'm satisfied with the person I am.	38(13%)	122(41%)	91(31%)	29(10%)	12(4%)	3(1%)	0(0%)
A person's personality usually stays the same during his or her adult life.	37(13%)	91(31%)	66(22%)	29(10%)	40(14%)	28(9%)	4(1%)
I can change parts of my personality if I want to.	2(1%)	7(2%)	20(7%)	24(8%)	93(32%)	121(42%)	22(8%)
I know what my friends and family think about me.	5(2%)	30(10%)	62(21%)	59(20%)	92(31%)	40(14%)	7(2%)
I care what my friends and family think about me.	3(1%)	1(0%)	4(1%)	14(5%)	38(13%)	140(48%)	94(32%)
I trust what my friends and family think about me.	1(0%)	2(1%)	7(2%)	32(11%)	57(19%)	148(50%)	47(16%)
Physically, I am in good health.	2(1%)	7(2%)	17(6%)	13(4%)	63(22%)	140(48%)	51(17%)
Mentally, I am in good health.	2(1%)	5(2%)	22(7%)	25(8%)	76(26%)	131(44%)	34(12%)
In general, I haven't had much success trying to improve myself.	13(4%)	66(22%)	78(26%)	83(28%)	40(14%)	14(5%)	1(0%)

Table 1. Participants' Reponses to the Pre-test

Questions	Strongly Disagree	Disagree	Slightly Disagree	Neither Agree nor Disagree	Slightly Agree	Agree	Strongly Agree
I enjoyed reviewing and interpreting my personality feedback report.	1(0%)	2(1%)	2(1%)	17(7%)	47(19%)	126(51%)	50(20%)
Overall, I enjoyed participating in this study.	0(0%)	2(1%)	1(0%)	28(11%)	57(23%)	116(48%)	40(16%)
Reviewing and interpreting my personality feedback report made me feel uncomfortable.	18(7%)	100(41%)	47(19%)	39(16%)	31(13%)	9(4%)	1(0%)
Overall, I think the information I received on my personality feedback report was accurate.	0(0%)	0(0%)	6(2%)	14(64%)	64(26%)	146(60%)	13(5%)
My personality feedback report revealed information about myself that I did not already know	2(1%)	12(5%)	20(8%)	23(9%)	107(44%)	71(29%)	8(3%)
Periodically reviewing external feedback about myself (i.e. from friends and family) could help me make productive personal decisions.	0(0%)	1(0%)	3(1%)	19(8%)	49(20%)	131(53%)	42(17%)
When they become available, I am interested in using new PersonalityPad.org tools to learn more about myself.	1(0%)	11(5%)	14(6%)	40(17%)	66(27%)	92(38%)	18(7%)
Based on the personality feedback I received during this study, I have some personal changes in mind that I would like to pursue.	0(0%)	7(3%)	9(4%)	43(18%)	88(36%)	79(33%)	17(7%)
	Very Bad	Bad	Slightly Bad	Neither Good nor Bad	Slightly Good	Good	Very Good
How did you feel about yourself after reviewing your personality feedback report?	0(0%)	2(1%)	19(8%)	54(22%)	71(22%)	89(37%)	8(3%)

	Nothing/ Not at all 1	2	3	4	5	6	7	8	9	A Whole Lot/ Extremely Likely 10
On a scale of 1-10, how much did you learn about yourself (overall) by participating in this study?	1 0%	5 2%	12 5%	14 6%	30 12%	59 24%	65 27%	37 15%	14 7%	7 3%
On a scale of 1-10, how likely are you to pursue a personal change based on what you learned about yourself?	3 1%	3 1%	13 5%	12 5%	35 14%	46 19%	73 30%	36 15%	12 5%	12 5%

	I did.	My Friends/Family did.	I didn't get friends/family feedback.
If you received personality feedback from your friends/family, who do you think provided a more accurate depiction of your true personality?	49 21%	99 42%	89 38%

Table 2. Participants' Reponses to the Post-test

appeals to their sense of the centrality of self, their desires to achieve personal goals, and their search for trustworthy and credible feedback from peers and others close to them. The results from the current study have strengthened the researchers' resolve to explore such pedagogical strategies that portray college learning as intensely personal and relevant to solving larger world problems, such as sustainability.

The way that the Personality Pad platform supported both pedagogy and research is another aspect of the current project that should not be overlooked. Current learning management systems (LMS) are not designed to support college faculty in their dual roles as both educators and researchers, nor to encourage them to push the boundaries of pedagogy in ways that are grounded in such traditions as action research (as has been done in business settings, e.g. Orlikowski, 1996). While students are frequently used as the subjects of faculty research, rarely do the goals of the research, and the goals of the pedagogy line up so clearly as in this case. Systems such as Personality Pad which encourage such synergies should be explored further.

LIMITATIONS AND FUTURE DIRECTIONS

Several limitations were encountered when conducting this study. First, the tool was not ready by the first day of the semester. Participants were not invited to join Personality Pad until the beginning of the third week of the semester. At that point they had already had several lectures and material to study regarding individual sustainability. As such, the results here may not reflect the level of engagement or reflection that might be observed if the tool were employed without priming. Second, it was discovered that the instructions did not instruct participants to wait for friends/family feedback before completing the post-test. As such, many of the participants (38%) did not receive feedback from friends/family prior to responding to the post-test, which could have implications for how they interpreted their feedback and how they chose to set goals.

Another limitation realized by the researchers was the lack of data on whether or not students acted on their plans for change. Later this semester, a second round of follow-up surveys with the same students will be conducted to see if they actually implemented the development goals they set while by using PersonalityPad.org. These new methodologies call for considerable additional experimentation before substantial claims of success can be made, but early results are clearly positive. It appears that encouraging individuals to reflect upon their own personality factors and behaviors using multi-source feedback motivates them to more closely align their behaviors to their stated values and the opinions of others.

Another limitation of the study was the lack of control groups for comparison. This limitation was known going into the study, but the researchers needed the opportunity to get more experience with the tool and understand how it would work in live settings before moving on to more controlled trials. In the next phase of development, the tool will be adapted to allow some participants to receive no friends/family feedback, no feedback at all, or some other combinations of feedback so that truly randomized trials with control groups can be done.

The Wordpress plugin links the content management versatility of Wordpress to the surveying power or Qualtrics, creating an adaptable platform that can be used to assess personality, behavior, or performance in a many personal, academic, and professional contexts. Currently, two new projects on PersonalityPad.org are being developed. The first will assess Individual Sustainability, defined as living a sustainable lifestyle involves self-awareness and harmony among one's values, thoughts, and behaviors, as well as a globally responsible daily life. The second new effort, the Professional Identity Project (PIP) will allow individual assesses the degree to which their own personality characteristics and behaviors may predict success in workplace environments. While professional skill inventories are common, few assess professional personality factors and key organizational behaviors prior to employment. This type of insight may be particularly valuable during the interview process. Academic applications for the feedback platform are also evident. As a classroom tool for assessing team behavior in course projects, for example, PersonalityPad.org could offer students and instructors "real-time," formative assessment of course projects.

CONCLUSION

In conclusion, the need to "innovate up" in our use of technology to support pedagogy is just as pressing now as it was when Leidner and Jarvenpaa first identified it in 1995. Personality Pad is an example of such technology. It combines open-source software with commercial web services to support an infrastructure for both research and learning that allows college faculty members to engage in both teaching and scholarship simultaneously. It is also an example of a technology that matches the personality characteristics of modern students to give them an engaging and meaningful learning experience in areas that are broadly of interest to society, such as sustainability. There is much work left to do, but Personality Pad is a step in the right direction.

ACKNOWLEDGMENTS

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