Enhancing Emotional Intelligence Through ePortfolio Self-Initiated Strategies

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The study objective was to determine if self-identified initiated strategies to enhance emotional intelligence (EI) through ePortfolio assignments resulted in EI changes from the first to third years in a professional pharmacy program. The Emotional Intelligence Appraisal (EIA) tool was used to measure proficiency in four EI skill areas (self-awareness, self-management, social awareness, relationship management). Each semester for their ePortfolio, students identified three personal improvement strategies to implement in an EI area. Outcome measures were EIA score changes, activity implementation/success, and the association between P3 GPA and EIA scores. Two class years were included (N = 136). Most students (52%-60%) improved EIA scores from the P1 to P3 years, with increases significantly related to numbers of activities successfully implemented (p = 0.04). For those with perceived successful implementation of all activities in at least one EI skill area, from 73% (relationship management) to 94% (self-awareness) improved their score in that area. With failure to implement any strategies for a specific area, from 73% (social awareness) to 87.5% (relationship management) had a score decrease in that area. No significant correlations were seen with scores and GPA. Self-identified and initiated activities through ePortfolio assignments provide a viable approach for improving students' EI skills.

Electronic portfolios (ePortfolios) have been used extensively in higher education to promote self-learning, including self-regulated learning, with self-assessment and reflection an important part of such learning (Lu, 2021). Using ongoing reflection to provide insight into actions and behaviors and to develop self-assessment skills is felt to improve education and promote lifelong learning (McMillan & Hearn, 2008; Plaza et al., 2007). Self-regulated learning includes the ability to help students manage their thinking, behaviors, and emotions to allow them to better manage learning (Segaran & Hasim, 2021). Delors (2013) discussed the four pillars of education—learning to know, learning to do, learning to live together, and learning to be—that were part of a prior report by the United Nations Educational, Scientific and Cultural Organization (UNESCO) and emphasized the interconnectivity of these pillars. He indicated that the ability to live together, including tolerance and understanding, and the promotion of self-confidence and self-esteem are critical in society, and knowing oneself better is critical to lifelong success. ePortfolios were successfully used in an introductory organizational behavior course for business majors to emphasize those four pillars of education through a team portfolio assignment with reflections (Andrade, 2019). Students' reflections showed that the ePortfolio assignment helped them, among other skills, work together, understand others' needs and increase tolerance, and improve self-awareness. Since many of the attributes improved by an ePortfolio are components of emotional intelligence (EI), ePortfolios could be a useful tool for developing students' EI in a manner that facilitates, and documents self-directed strategies used.

The concept of EI appeared in the literature beginning in the 1990s. The characteristics have been modified over time with the importance of emotions and one's ability to discern, monitor, and regulate them incorporated into different models. Examples of EI models include the mental ability model that focuses on emotions themselves (e.g., Mayer and Salovey model) and mixed models that encompass both emotions and characteristics such as motivation and relationship skills (e.g., Goleman model; Mayer et al., 2007). Although initially applied to the business field, there has been growing recognition of EI as important for healthcare professionals and in higher education (Goleman, 1998; Joseph et al., 2019; Zhoc et al., 2018). Emotional intelligence might help predict students' academic and/or professional success (Romanelli et al., 2006), although studies have shown inconsistent correlations between EI and academic performance measures such as grade point average (GPA; Chew et al., 2013; Cheshire et al., 2015; Jaeger 2003; Nath et al., 2015; Zhoc et al., 2018).

Overall, only about half of the top U.S. educational institutions were found to offer a course addressing EI in some capacity; institutions that offered EI training programs used a variety of approaches such as lectures, role-playing, discussions, and reflections (Joseph et al., 2019). In pharmacy education, accreditation standards require EI components such as self-awareness and relationship management (e.g., leadership skills, functioning in a team, interacting with patients, caregivers, and health care providers) to be addressed in pharmacy curricula (Accreditation Council for Pharmacy Education [ACPE], 2016). Most EI educational activities involving pharmacy students have focused on leadership development programs, with EI improvement demonstrated after program completion (Hall et al., 2015; Smith et al., 2018). Nelson et al. (2015) recommended incorporating EI-related competencies into pharmacy curricula to build students' self-awareness and professionalism, and Lust and Moore (2006) found students valued EI inclusion in a required

communications course and perceived its practical applications to pharmacy practice.

Since 2009, the West Virginia University (WVU) School of Pharmacy has used an online portfolio for students that includes assignments to help develop self-assessment skills (Kalata & Abate, 2013), with modification over time to primarily focus on several longitudinal program educational outcomes (Scartabello et al., 2018). An EI component was added to the portfolio in 2015 that includes assignments throughout the didactic curriculum designed for student EI self-analysis and self-initiated improvements. However, whether EI can be enhanced through portfolio-based assignments unrelated to specific EI courses or training programs had not been explored. We hypothesized that students would enhance their EI if they implemented personal improvement strategies, which could translate into better self-discipline and academic performance. The objectives of this study were to determine if self-identified and self-initiated strategies to enhance EI as part of an ePortfolio were successfully implemented, and whether or not these strategies were associated with subsequent EI score changes and correlated with student GPA.

Methods

Study Sample

The pharmacy curriculum at our institution is a full-time, 4-year professional program that students enter after completing at least two years of prerequisites. The pharmacy students are required to complete an ePortfolio as part of program graduation requirements. Two class cohorts (graduating classes of 2019 and 2020), who each completed the EI curriculum component of the portfolio and took the EIA twice (during their first professional [P1] and third professional [P3] years), were included as study subjects. The study protocol was granted exemption by WVU's Institutional Review Board.

Portfolio Requirements

For several years, the WVU School of Pharmacy required all students to complete ePortfolio assignments each semester during all four professional years of the curriculum. The CORE® Higher Education Group's CompMS was used for the ePortfolio beginning in 2015 (CORE Higher Education Group, West Warwick, RI). Students attend an hour-long session to describe the ePortfolio goals and assignments for each semester. During this session, step-by-step instructions on how to access CompMS, upload course-related artifacts, and complete the needed assignments were reviewed. The recorded session and instructions were also posted for student review during the semester. The ePortfolio

program director was available to answer any questions and troubleshoot problems. Currently, the ePortfolio assignments each semester consist of (a) student entries of course assignments they feel relate to each of five School longitudinal program outcomes, accompanied by descriptions of how the assignments related to the specified outcomes of interest and reflections on how they can continue to improve; (b) a rubric self-assessment of one of the longitudinal outcomes each semester, in which students rate their level of competency for each criterion and provide justifications for ratings; and (c) an EI component.

The required EI component was added to the ePortfolio based on the EI model described in the book, *Emotional Intelligence 2.0* (Bradberry & Greaves, 2009). During the first P1 year, all new incoming students received a copy of the Bradberry and Greaves book that includes the Emotional Intelligence Appraisal (EIA) online test. The EIA is a self-administered test (28 items, ranked using a frequency response scale from 1 = *never* to 6 = *always done*) to measure the four main skill areas in the EI model: self-awareness, self-management, social awareness, and relationship management. Upon completion, a total EI score and four area composite scores are provided to students along with a personalized score report. Prior to a discussion of EI during an introductory pharmacy course, students were asked to read the chapters on self-awareness and self-management and completed the EIA for the first time. During this course session, self-awareness and self-management skills related to personal and professional growth were discussed, and students developed individual self-management goals and a plan for the P1 year. At the end of their spring (second) semester during a class session, P1 students reviewed their plans and provided examples of progress made toward goals. The remainder of EI assignments in the curriculum were part of the ePortfolio.

During each semester beginning the fall P1 year for the ePortfolio, students were asked to read the relevant *Emotional Intelligence 2.0* book chapters, review their personalized score report, and identify three improvement strategies for an EI area, addressed in the following order: (1) self-awareness (fall P1 year), (2) self-management (spring P1 year), (3) social awareness (fall second professional [P2] year), and (4) relationship management (spring P2 year). Beginning during the spring P1 semester and continuing into the P3 year, students were also asked to list the three improvement strategies entered in the ePortfolio the previous semester and to describe if they implemented the strategy, and—if so—how successful it was, including examples of what they did. If not implemented, they briefly explained why not. At the end of the spring P3 year, students reflected on their prior portfolio entries for all four EI skills and completed the EIA a second time.

All ePortfolio assignments, including those involving EI, are part of the requirements for a specific course in the curriculum each semester. While the ePortfolio content does not receive a letter grade in the respective courses, students must complete and submit all the required ePortfolio assignments to successfully "pass" that component. An instructor completes a checklist at the end of each semester to ensure all needed work was done, and students are required to revise any incomplete ePortfolio submissions until a passing grade is obtained. Students did not receive individualized feedback about the content of their EI submissions beyond ensuring that all required parts (as described previously) were completed. Examples of thoughtful (anonymous) submissions from prior students were posted for student review, as desired.

Outcome Measures

All students' EI portfolio entries and EIA scores for the four EI areas were compiled, using randomly assigned numbers as identifiers, as follows: (a) individual scores for each skill area, (b) section scores for the combined personal competence skills (self-awareness, self-management) and social competence skills (social awareness, relationship management), and (c) a total EIA score. Changes in EIA scores, total and for individual components, from the first EIA (P1 year) to the second EIA (P3 year) completion were determined and coded as NC (no score change), POS (score increased), or NEG (score decreased). In addition, we recorded each student's professional program GPA at the start of the spring semester P3 year.

The three improvement strategies the students identified for each EI area were also reviewed by two of the investigators, including whether the strategy was subsequently implemented and felt to be successful. Students' entries were coded as A, P, or N for each of the four EI areas, as follows: (a) A = the student stated they implemented all three strategies and indicated that each was largely successful (e.g., "very," "completely," "mostly";

They could indicate further work was still needed on a strategy as long as they clearly stated their planned implementation was successful); (b) P = student stated they implemented one (PI 1) or two (PI 2) strategies with complete or partial/some success, or implemented all three (PI 3) strategies with at least partial/some success (but not all with complete success); and (c) N = student stated either none of the three strategies were implemented, or they implemented only one, two, or all with only minimal or no success. For example, if a student stated they implemented all three of their planned strategies but only one was successful (complete or partially), or they only implemented one strategy with complete or partial success, those entries would be coded as PI 1. If a student stated they implemented a strategy with no indication of success provided, that strategy was considered unsuccessful for coding purposes.

Data Analysis

All statistical analyses were performed using JMP Pro Version 14.0 (SAS Institute, Inc.). Descriptive statistics included the percentages of score changes overall for the two EI sections (personal competence skills and social competence skills) and for the four EI areas. Implementation and success (e.g., A, P, PI 1, PI 2, PI 3, N) of the three student-identified improvement strategies and the score changes (POS, NC, NEG) for each EI area, score changes (increased or decreased) based upon first test results, and score changes based upon the implementation of improvement strategies, were analyzed using Fisher's exact or chi-square tests as appropriate. Student t tests were used to compare initial mean scores for the EIA sections in students with increases or decreases of at least 5 points from the P1 to P3 years. Pairwise correlations analyzed the association between GPA and the overall EIA test scores, changes in the scores from the first to the second test, and changes between the two EI sections.

Table 1
Changes in Emotional Intelligence Appraisal (EIA) Scores[a]

EIA component	Scores increased	Scores decreased	No change
Total EIA score[b]	78 (57.4%)	55 (40.4%)	3 (2.2%)
Personal competence section[b] (self-awareness and self-management)	82 (60.3%)	51 (37.5%)	3 (2.2%)
Self-awareness	75 (55.1%)	49 (36.0%)	12 (8.8%)
Self-management	71 (52.2%)	50 (36.8%)	15 (11.0%)
Social competence section[b] (social awareness and relationship management)	74 (54.4%)	60 (44.1%)	2 (1.5%)
Social awareness	60 (44.1%)	53 (39.0%)	22 (16.9%)
Relationship management	72 (52.9%)	48 (35.3%)	16 (11.8%)

Note.[a]P3 score minus P1 score.
[b]Chi-square for total and main section comparison (decreased/no change categories combined), *p* = 0.62.

Table 2
Examples of Student Portfolio Entries for Each Category of Implementation

Implementation categorization	Examples of students' entries
N = No implementation	"The first strategy I said I was going to work on was greeting people by name. The second strategy was listening to others not only verbally but by watching them for their visual cues. The third strategy was catching the mood of the room by assessing my situation every time I enter a new environment. I honestly have not worked on any of these. I completely forgot about them." "1. Make sure I have set aside some time in my day to think about solutions to problems and make decisions so that they aren't affected by emotions. I haven't really implemented this strategy, as I haven't found the time to do so. 2. Realize and accept that change is a part of my life. I have tried to think more about this, because I realize that I don't react very well to change, but it has been hard for me to go beyond that. 3. Give myself some time each day to recharge mentally. I don't consciously set aside time to focus on recharging, as I am always thinking of the next thing that I have to get done."
P = Partial implementation	"1. Accept That Change is Just Around the Corner - I think over the past semester I have gotten better at being more flexible. I've worked to be more open to change my "vision" on projects at they develop and in accordance with what my group thinks. 2. Take Control of Your Self-Talk - I have worked to implement this, but sometimes it is still difficult to control. I find myself still slipping in to negative self-talk when under stress, but I am working on it. 3. Sleep On It - I think I have most successfully implemented this strategy. It has helped me make more calm decisions and think about all the options I have." "1. Greet people by name. I think I've improved at this greatly. I greet my classmates by name when they sit at my table. 2. Choose to be empathetic when the need arises. Although I cannot always relate to people's feelings (especially when it involves a decision they made when I don't agree with what they did), I think that I was still able to put myself in others' shoes at various times, especially with my roommate. 3. Choose to not get exasperated with people who choose to behave differently than me. I think I still get exasperated. I'm very bent on believing that my way of thinking and decision making is less flawed . . ."
A = All strategies implemented and successful	"1) Taking control of my self-talk I have implemented this and it was successful. I have learned to take control of my thoughts and to focus on the important things. . . . I try to think good, encouraging thoughts more than negative. 2) Accepting that change is just around the corner. I have implemented this, and it was successful. I have learned to adjust to change better. . . . I am aware of change, so when things happen, I don't get as upset or worked up about it. 3) Focusing my attention on my freedoms rather than my limitations. I have implemented this and it was successful. I try to focus more on the positives than negatives like I stated above. I have a lot to be grateful for, and I should not let the small trials in front of me forget about all the blessings I have." "First, I said I will try to work on my patience rather than jumping to conclusions. I helped to improve on this by trying my best to remain calm while in arguments. . . . I was successful with this because it created less stress in my life and taught me that it is okay to take a step back and think about things before lashing out and blaming everything on the other person. Second, I said I would improve on smiling and laughing more when feeling down. I helped to improve on this when I was stressed out with school this semester. . . . Whenever I was feeling down about school, I would surround myself with my friends and think of the positive things…I also became really close with a group of friends in my pharmacy class. . . . They helped make me smile and laugh more even when it was our hardest weeks of this semester. Therefore I was successful at this because now I feel like I actually have a support system while in pharmacy school. . . . I am a lot more happy and excited to go to class everyday. Lastly, I said I would improve on my quality of sleep. I did improve on this because I started to study at my desk rather than in my bed. I also tried to get in bed by midnight and to avoid coffee at night. . . . . I think these strategies helped me sleep better because I would wake up feeling not as exhausted as I used to."

Results

EIA Scores

Data from all 69 students in the graduating class of 2019 and 67 students in the class of 2020 (total = 136) with complete EIA and portfolio entry data were included in this study (seven students total with missing data were excluded). We reviewed a total of 569 entries across the four EI areas; similar mean scores were seen for each area on the P1 year EIA results (range = 74-76 points) and on the P3 EIA results (range = 75-78 points). Compared to the P1 year, most (57.4%) of the P3 EIA total scores improved and about 40% declined (Table 1).

The majority of scores improved for the personal competence (self-awareness and self-management combined) and social competence (social awareness and relationship management combined) subsections, 60% to 54%, respectively. Most students' (52.2% to 55.1%) scores improved for the individual EI areas except for social awareness (44.1% improved). From 35% to 44% of students' scores decreased for individual areas.

EI Activity Implementation and EIA Scores

Most students indicated they implemented at least one of their self-identified EI improvement activities, with varying degrees of success. Some improvement strategies for the EI areas included, among many diverse ideas, "greet people by name," "focusing on my health more and minimizing stress," "catch the mood of the room," "take control of your self-talk," "create a routine," and "visualize yourself succeeding." Of the 569 student entries, 93 (16.3%) indicated all three activities were successfully implemented (A), 431 (75.7%) indicated one or more activities were at least partially successful (PI 1 - PI 3), and only 45 (7.9%) stated they were not successful in implementing any planned activities (N). Table 2 provides examples of students' descriptions of activities entered into the ePortfolio for the three main implementation categories. The breakdown and analysis of the activities partially implemented and successful (PI 1, PI 2, or PI 3) vs. students' total EIA score changes from the P1 to the P3 years are shown in Table 3. There was a statistically significant difference ($p = .04$) in the proportion of scores that increased, decreased, or stayed the same based upon the number of activities that students indicated were at least in part successfully implemented. More EIA area scores improved as the number of activities successfully implemented increased from one to three. About 41% of students' scores for an EIA area improved with only 1 activity implemented, with 44% of scores worsening, compared to about 56% of students 'scores improving with 3 activities implemented with only 27% worsening.

Statistically significant differences were also found in the extent to which improvement activities were implemented for each of the individual EI areas and score changes (Table 4). Partially implemented activities (PI 1-PI 3) were combined for these analyses due to small Ns for some cells. Overall, as the number and extent of successfully implemented activities increased, students' scores in an area were significantly more likely to have improved. For successful implementation of all three activities (A) in an area, approximately 73% to 94% of students improved their EIA score in that area. In contrast, with failure to implement any strategies for an area (N), from 73% to almost 88% of students had a decreased score in that area. Students' scores in an area when activities were partially completed (P) fell between the A and N ranges, with most scores showing improvement. For both the personal competence and social competence subsections, the proportions of students with the largest score changes of at least 5 points (increased or decreased) differed significantly in the extent to which improvement strategies were implemented (Table 5). A total of 77.6% of students with an increase in their personal competence EIA scores by 5 or more points had implementation ratings of A, PI 3, or PI 2, compared to 58.9% of those with a decrease of at least 5 points. The difference was more striking for social competence: 83.5% of students who increased their scores by 5 or more points had implementation ratings of A, PI 3, or PI 2, compared to only 51.6% of those with decreased scores of 5 or more points.

Comparisons were also made to determine if the initial mean EIA score varied in those with large subsequent changes (increases or decreases of at least 5 points) in their second EIA scores (Table 6). The mean EIA scores on the first test, for the total as well as the personal competence and social competence subsections, were found to be significantly lower (about 10 to 11 points) for those whose P3 year EIA increased by at least 5 points, compared to those with a decrease of 5 or more points.

Table 3
Partially Implemented Activities and EIA Score Changes

Number of planned activities	Score changes for combined four EIA areas		
implemented and successful[a]	Scores increased	Scores decreased	No change
PI 1 (*n* = 129)	53 (41.1%)	57 (44.2%)	19 (14.7%)
PI 2 (*n* = 224)	122 (54.5%)	79 (35.3%)	23 (10.3%)
PI 3 (*n* = 78)	44 (56.4%)	21 (26.9%)	13 (16.7%)

Note. Chi-square for comparison across categories, *p* = .04.
[a]PI 1 = One planned activity implemented with complete or partial success.
 PI 2 = Two planned activities implemented with complete or partial success.
 PI 3 = Three planned activities implemented with at least partial success (not not all completely successful).

Table 4
EIA Score Changes and Improvement Implementation

Worked to implement[a]	Self-awareness Change in EIA score[b] N (%)[c,d]			Self-management Change in EIA score[b] N (%)[c,e]			Social awareness Change in EIA score[b] N (%)[c,f]			Relationship management Change in EIA score N (%)[c,g]		
	POS	NC	NEG	POS	NC	NEG	POS	NC	NEG	POS	NC	NEG
A	8 (80)	0	2 (20)	15 (93.8)	1 (6.3)	0	9 (81.8)	1 (9.1)	1 (9.1)	22 (73.3)	3 (10)	5 (16.7)
P	66 (56.9)	11 (9.5)	39 (33.6)	55 (50.9)	12 (11.1)	41 (38)	49 (44.6)	20 (18.2)	41 (37.3)	49 (50.5)	12 (12.4)	36 (37.1)
N	1 (10)	1 (10)	8 (80)	1 (8.3)	2 (16.7)	9 (75)	2 (13.3)	2 (13.3)	11 (73.3)	0	1 (12.5)	7 (87.5)

Note. [a]A = All three strategies successfully implemented; P = 1, 2, or 3 strategies implemented with at least partial success; N = no strategies implemented or successful.
[b]P3 score – P1 score, POS = score increased, NC = no change in score, NEG = score decreased.
[c]Exact test was used to determine significance, defined as $p < 0.05$, between strategy status and change in EIA score for each EIA category.
[d]$p = .014$
[e]$p = < .0001$
[f]$p = .0051$
[g]$p = .0012$

Table 5
EIA Score Changes (>5 Points) and Improvement Implementation

EIA score change[a]	Personal competence[b] Improvement strategy implementation					Social competence[c] Improvement strategy implementation				
	A, PI 3 n (%)	PI 2 n (%)	PI 1 n (%)	n (%)	p	A, PI 3 n (%)	PI 2 n (%)	PI 1 n (%)	n (%)	p
Increased	32 (27.6%)	58 (50.0%)	23 (19.8%)	3 (2.6%)	.009	43 (44.3%)	38 (39.2%)	15 (15.5%)	1 (1%)	< .0001
Decreased	7 (12.5%)	26 (46.4%)	16 (28.6%)	7 (12.5%)		9 (14.1%)	24 (37.5%)	17 (26.6%)	14 (21.9%)	

Note. Chi-square for comparison across categories, $p = .04$.
[a]Change of > 5 points (first to second test).
[b]Includes self-awareness and self-management.
[c]Includes social awareness and relationship management.

Table 6
EIA Score Changes (≥ 5 Points) and Initial EIA Mean Area Scores

EIA score change[a]	Personal competence[b,c,e]			Social competence[b,d,e]			Total Score[b,e]		
	n	*M*	95% CI	*n*	*M*	95% CI	*N*	M	95% CI
Increased	59	69.6	67.8-72.0	49	71.3	68.9-73.6	50	70.8	68.6-73.1
Decreased	28	81.3	78.2-84.3	32	80.9	78.0-83.8	26	80.4	77.3-83.5

Note.
[a]Change of ≥ 5 points (first to second test).
[b]Scores on first test.
[c]Includes self-awareness and self-management.
[d]Includes social awareness and relationship management.
[e]*t* test, *p* < .0001 for comparison of means between increased and decreased EIA score changes.

GPA and Total EIA Scores

When analyzing the associations for both the P1 and P3 years between GPA and the total EIA scores, total score difference, and subsection score differences, all *r* values were small and not statistically significant (*p* > 0.25) (Table 7). Further analysis examined if there was a correlation between the GPA and total EIA score differences, limited to only those students who had the largest changes in EIA scores: 24 students with a ≥ 10-point improvement (range = 10-27 points) and 12 students with a ≥ 10-point worsening (range = 10-23 points) in their EIA total score. No significant correlation was likewise found (*r* = 0.19, *p* = 0.25).

Discussion

Educational programs strive to promote lifelong learning skills in their students so they can adapt and function successfully in an ever-changing, diverse world upon graduation. ePortfolios can promote self-assessment, ongoing reflection, and self-regulated learning that includes the ability to manage and control behaviors and emotions (Lu, 2021; Segaran & Hasim, 2021), important skills for lifelong learning and learning to live together with others (McMillan & Hearn, 2008; Plaza et al., 2007). Emotional intelligence includes components such as self-awareness and the ability to manage relationships and socially interact, and ePortfolio assignments have been shown to help promote these skills in students (Andrade, 2019). Portfolios were reported to be used in 82% of the 49 colleges of pharmacy who responded to a survey of strategies they used for student self-assessment (Wheeler et al., 2017). Pharmacy program accreditation standards require EI components, such as self-awareness, personal development, and the ability to function as part of a team and to interact with others, to be addressed in pharmacy curricula. Further, portfolios are specifically mentioned in the standards as an example of documentation tools that can be used by students to demonstrate their self-assessment and reflection on learning needs, plans, and achievements (ACPE, 2016). Therefore, incorporating ePortfolio use into curricula could be valuable for developing students' EI.

Several tools are available for measuring EI and related social constructs, defined in various ways (Consortium for Research in Emotional Intelligence in Organizations, 2020). There is not a universally accepted instrument to measure EI in the health professions, perhaps due in part to a lack of precision in conceptualizing EI (Pfeiffer, 2001). Bradberry and Greaves's (2009) book with EIA tool was used for EI instruction for our students in part due to its broad popularity.

Most EI studies involving pharmacy students have focused primarily on the development of leadership skills, with an improvement in EI ratings seen in pharmacy students after completing specific leadership programs (Haight et al., 2017; Smith et al., 2018). However, the aim of our study was unique since it focused on the utility of ePortfolio-based self-assessments, rather than courses or programs, to guide non-leadership focused EI improvements in the didactic curriculum.

The current study demonstrated that student self-identified and initiated portfolio activities, selected from among ideas provided in their EI book and personalized EI test result reports, resulted in improved EI scores in many individuals. A greater percentage of students improved their scores in the personal competence EIA subsection compared to social competence. Students received some limited didactic instruction for only the personal competence subsection, which might help explain the higher scores seen for this area. Overall, the total EIA score and the scores for each area improved for over half of the students, except for social awareness (~44% improved). Mean scores across all four areas were similar for the P1 and P3 EIA results, so higher initial scores for social awareness did not appear to explain this difference. However, fewer students stated they successfully implemented activities to improve social awareness compared to the other three areas (15 "N" ratings for social awareness vs. 8 to 12 "N" ratings for the others; Table 4), which might explain at least some of the lesser improvements seen (see below).

Table 7
GPA Correlations with EIA Scores[a]

Variable	r	p
Total score - P1 year	-0.04	.68
Total score - P3 year	0.06	.46
Total score difference	0.09	.32
Personal competence difference	0.02	.86
Social competence difference	0.1	.27

Note. [a]Pairwise correlation analysis

An important finding from this study was that successful implementation of ePortfolio based activities designed to improve specific EI skills was associated with enhancement in those areas. Students were required to self-assess their needs and reflect on the success of initiated activities, which are valuable components of ePortfolio use. Students who felt they were able to adopt all their identified strategies were significantly more likely to show EI score improvement compared to students who reported partial or no successful activity implementation. The difference was particularly striking for students who stated they were successful in implementing all three improvement activities (73% to 94% with score improvement in the four areas) compared to those who indicated no successful implementation of any activities (0% to 13% with score improvements). Larger score changes of at least 5 points higher or lower in the EIA results were also found to differ significantly based upon the extent to which improvement strategies were stated to be implemented. More improvement strategies were successfully implemented when there were score increases of 5 or more points compared to score decreases of 5 or more points. Assuming that most students were honest about strategy implementation, greater effort would be anticipated to result in greater changes.

About three-quarters of students' EI activity entries fell into the partial implementation and improvement category, with perceived success in some activities but not others. As students reported greater numbers of targeted EI activities to be successful, the proportion with score increases were significantly greater and the proportion with score decreases in an EI area were lower. In general, the differences among the number of activities felt to be successfully implemented and score changes are consistent with the conclusion that EI skills can be developed; this study found that self-initiated activities through ePortfolio assignments can help accomplish this.

It is unclear why 27% to 35% of students who felt they implemented with at least partial success two or three improvement strategies in an area had decreased scores in those areas. Since the success of many of the activities identified (e.g., getting more sleep, counting

to 10 before responding, thinking before speaking, creating daily agendas) cannot be objectively assessed by evaluators, there needs to be some reliance on student responses. It is possible, though, that students with score decreases might have claimed to make changes they never did or described ongoing, but not necessarily successful, activities rather than those newly implemented. Students might have also perceived that a strategy was successful, such as improving interactions with peers, but that perception might have been inaccurate. Further, even if a student successfully implemented strategies for improvement, the activities selected might have been those "easier" for them to change and not necessarily the activities that would most benefit their EI. It should also be noted that some responses were vague or not sufficiently detailed to enable accurate classification of the portfolio entry as being implemented or successful. Since these activities were coded as unsuccessful, it is possible that they might have resulted in some success, which could affect the overall score change analyses.

Interestingly, students with lower mean EIA initial scores showed considerably greater improvements in subsequent scores compared to those with higher initial scores. Students who rated their skills higher on the first EIA might have overestimated their abilities, and after completing the EI readings and exercises, provided more realistic and lower self-assessments the next time. Dune et al. (2018) evaluated the use of ePortfolios to develop students' reflexivity (i.e., the ability to self-assess and reflect) in a first-year multidisciplinary health sciences communications course and found 38% of students showed decreased post-survey scores. Similar to our findings, students who scored lower on their pre-portfolio survey items had significantly higher post-portfolio scores. They speculated that decreased reflexivity scores could still be a sign of skill improvement, with students able to recognize deficiencies to a greater extent post-portfolio use. This is also consistent with observations by the investigators for another ePortfolio assignment in which students rated their skill level for specific longitudinal outcomes (e.g., communication, teamwork, evidence-based practice) twice during the pharmacy program—initially and at the end of the P3 year. When asked to

explain their ratings, at least half of the students who rated their second self-assessment at the same or lower level of proficiency stated they overrated their skills on the first self-assessment. The opposite—students indicating they underrated their first self-assessments—was not observed.

A positive association between EI and academic performance (e.g., GPA, project grades) has been reported, suggesting that EI might be a useful predictor for academic and/or professional success (Chew et al., 2013; Haight et al., 2017; Jaeger, 2003; Romanelli et al., 2006), although not all investigators have found significant relationships (Cheshire et al., 2015; Nath et al., 2015). In this study, the correlations between GPA and EIA scores were very small and not statistically significant. Reasons for discrepancies in GPA and EI correlation findings are unknown but differing student populations and varying instruments used to measure EI among studies could be contributing factors.

Some limitations of this study should be noted. The sample included only two cohorts of students from the WVU School of Pharmacy, so further studies should include larger numbers of students and those from other academic disciplines. Whether use of the EIA was optimal as a measure of EI in the health professions is not known but was appropriate to consider as a widely used EI instrument. It was difficult at times to accurately determine the actual implementation and success of student selected EI improvement activities based upon the ePortfolio statements, although two investigators reviewed entries to help minimize discrepancies. The EI portfolio assignments were subjective in nature and dependent on student identified reporting. Given that the EI activities were self-reported, whether students implemented the activities they claimed to perform or whether students responded to the EIA questions on both tests in a manner that accurately reflected their true opinions cannot be determined. However, since there were no penalties associated with failure to implement self-identified activities, there was little reason for students to respond dishonestly. Finally, the success of the activities implemented was based on subjective student perception and might not have been completely accurate in reality.

Future research can compare changes in EI that result from ePortfolio self-identified and self-initiated activities to those resulting from formal coursework, beyond leadership development programs. Whether greater faculty involvement in reviewing student portfolio entries at different time points in a program might result in greater EI changes would be useful to examine. The validity and reliability of various EI measuring tools should also be explored in different professional programs. Finally, whether student achievement in certain components of curricula (e.g., specific didactic courses in a major, elective courses,

experiential rotations) is more closely correlated with EI skills than broad measures of academic performance (e.g., overall GPA) should be studied.

Conclusion

This study demonstrated that EI skills could be enhanced using ePortfolio assignments in which students self-identify and self-initiate improvement strategies, with limited direct faculty involvement. Since programs within and outside of the health professions are including EI components such as self-awareness and social/relationship management in curricula, our findings can provide schools with a potential ePortfolio option for developing or enhancing these skills in graduates.

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