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Exploring the effects and benefits of a pilot school-based happiness mentoring programme with polytechnic students in Singapore

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Abstract

The state of mental health and related high rates of depression in youth is a growing concern worldwide. Some populations, however, seem to be more vulnerable than others; and this is the case with polytechnic students in Singapore. Positive psychology interventions (PPIs) have been found to enhance the level of happiness and well-being of students when delivered in the school context. Intervention efforts have often been limited to a single or two to three PPI activities and rarely offered as a consolidated programme with multiple PPIs that would allow students to identify and adopt strategies that would best support their well-being. This quasi-experimental pilot study tested the effects of a school-based happiness mentoring programme largely based on the PERMA model on a small sample of full-time students of a polytechnic in Singapore. Over a period of 10 weeks, the programme conducted by a mentor offered multiple PPIs aimed at enhancing participating students' level of happiness, well-being and student life satisfaction. While no statistically significant differences between the experimental and control groups were reported at pre- and post-intervention, statistically significant differences were found within each group. The results of paired *t*-tests showed significant statistical improvements in all variables within the experimental group, but the control group did not show significant within group improvements in Engagement, Meaning, Accomplishment and Student Life Satisfaction. These findings were supported by post-intervention structured interviews during which students reported having benefitted from specific PPIs in enhancing self-awareness, awareness of others and acquisition of several strategies that build positive emotions to sustain their well-being. Implications of the findings are discussed and suggestions for future research provided.

Keywords

Happiness
Mentoring
Positive psychology interventions
School-based intervention
Well-being
Youth

Highlights

• Ten positive psychology interventions (PPIs) activities fostering happiness and well-being and based on the PERMA model (Seligman, 2011) were assembled to create a happiness mentoring programme.

AQ1

• This programme was conducted over 10 weeks for a sample of tertiary students at a polytechnic in Singapore.

• The quasi-experimental study did not report significant differences between experimental and control group at pre- and post-test.

• The intervention reported more significant within-group gains for the experimental group than for the control group.

• The experimental group showed significant gains in Engagement, Meaning, Accomplishment and Student Life Satisfaction.

• A post-intervention feedback survey results show that the students in the experimental group seemed to have personally benefitted from the programme.

• Results and limitations are discussed (within group and between groups statistical gains, maturation effect, adherence to programme activities).

• Suggestions for future research is given in terms of structured PPIs to further explore and ascertain possible effects on adolescents' happiness, life satisfaction and flourishing.

Introduction

Education is more complete if young people today are empowered with knowledge and skills on how to live happily in addition to attaining academic success. This is especially critical for youths who are about to enter work life; young adults like polytechnic students need a lot of guidance or mentoring in living the kind of life they aspire. Growing into adult roles is a time of tremendous stress and struggle, as teachers tend to focus on academic achievement. In Singapore, for instance, youths are highly concerned with their studies, upcoming adult responsibilities and future uncertainties (National Youth

Council, 2018), with polytechnic students reporting to be the most vulnerable group.

Polytechnic students have been found to be more at-risk as they have lower self-esteem and resilience and face higher financial and academic stress when compared to other students in the Express stream, Junior Colleges, Integrated Programme and International Baccalaureate (National Youth Council, 2018). Without intervention, these polytechnic students are likely to become depressed and unhappy as they enter adulthood, joining the 20% of depressed youths worldwide as estimated by the World Health Organization (WHO, 2018). Equipping polytechnic students with the knowledge and skills to manage their stress will help them to live a happier life, improve their well-being and do better in life, groomed into healthy and resilient adults.

This pilot study proposes to mentor polytechnic students in developing positive personal attributes, like having positive emotions, being able to be engaged in learning, gratefulness, building relationships, etc., brought about by positive psychology interventions (PPIs) (Seligman, 2011) so that they can be equipped with knowledge and skills to live life *more* positively and thus overcome stressors.

Positive Psychology Interventions

PPIs have been used in educational contexts to foster well-being (Lyubomirsky et al., 2011; Norrish et al., 2013), develop positive emotions or happiness (Leskisenoja & Uusiautti, 2017) and improve academic achievement (Datu, 2018). One particular theory that defines well-being and happiness, and has become the foundation for numerous PPIs, is the PERMA model of well-being by Seligman (2011). This model proposes multiple evaluation criteria based on five elements which when put together contribute to the individual's happiness, overall well-being and, ultimately, flourishing. The five elements (PERMA) are Positive Emotions, Engagement, Relationships, Meaning and Accomplishment. *Positive Emotions* broaden a person's perspectives, reduce negative affect and improve resilience, build up resources creating an upward propensity towards well-being and enable personal flourishing as demonstrated in the broaden-and-build theory (Fredrickson, 2001, 2004). *Engagement* refers to a state of flow by Csikszentmihalyi (as cited in Nakamura & Csikszentmihalyi, 2014), a state in which people are deeply involved in challenging yet rewarding activities. *Relationships* appear to be the foundation of human well-being; it is the capacity to love and to be loved (Määttä & Uusiautti, 2013). *Meaning* in life is understood as contributing to something that one has found to be valuable and worthwhile (Seligman, 2011). *Accomplishment* relates to achieving success or

winning or completing a significant task which people are motivated to pursue for their own sake (Seligman, 2011). Since its inception, the PERMA model has yielded positive results through various research studies which affirmed the validity and reliability of the approach, particularly in educational context (Butler & Kern, 2016; Kern et al., 2015; Leskisenoja & Uusiautti, 2017; Lyubomirsky et al., 2011). The model's validity and reliability have also been supported across diverse cultural settings (Adler, 2016; Hidayat et al., 2018). For these reasons, the intervention for this study, aimed at fostering greater happiness and well-being and improving the students' school life satisfaction, is based on Seligman's PERMA model. In addition to the explicit teaching of the PERMA PPIs, the intervention in this study had assumed the mentoring pedagogy to ensure a better transfer of learning and development of positive attitudes, as planned mentoring programmes for at-risk youth have demonstrated (Fernandes-Alcantara, 2018; Thompson & Kelly-Vance, 2001).

Mentoring and School-Based PPIs

Mentoring efforts in the school context appear to support the development of happier and healthier students with improved academic, behavioural, social and emotional outcomes (DuBois et al., 2011; Grey, 2019; Karcher et al., 2002; Thompson & Kelly-Vance, 2001). Mentoring programmes conducted at various universities showed an improvement in reported well-being for the mentees through acquired new skills and an increased level of integration and retention for the students, and this was accompanied with greater student life satisfaction (Collings et al., 2014; Crisp et al., 2020; Guo, 2016). In a cross-cultural research study involving three non-western countries—Bhutan, Mexico and Peru (Adler, 2016)—the PPIs were applied to students using the Penn Resiliency Programme, a curriculum based on the PERMA model (Seligman et al., 2009) that imparted specific skills which fostered optimism, creativity, assertiveness, relaxation, coping and problem-solving skills over a period of 15 months. Regardless of cultural backgrounds and nationalities, all the treatment groups enrolled in the well-being fostering programmes delivered by trained teachers reported a significant increase in their individual well-being and academic results when compared to the control groups.

However, studies using PPIs in educational institutions mostly used one, two or three PPIs in their interventions with a teacher expounding on the skills needed to implement the PPIs; and mentors were rarely involved (Adler, 2016; Leskisenoja & Uusiautti, 2017). As such, this pilot study was set up to implement a *series* of PPIs in the form of a happiness mentoring programme (HMP) as polytechnic students who are late teens or young adults face more complex challenges and they need more help in the form of mentoring to

integrate possibly multiple PPIs into their life. As some PPIs might suit the polytechnic students better than others, this study examined if particular PPIs worked more effectively in addition to educating the students on the knowledge and skills of infusing PPIs into life situations.

In this study, the independent variable was the HMP intervention, and the dependent variables were Positive Emotion, Negative Emotion, Engagement, Relationships, Meaning (in life), Accomplishment, Happiness, Overall Well-Being and Student Life Satisfaction, which measured the effects of the intervention programme. In addition, structured interviews were conducted to find out the popular PPIs commonly used by the students and how these PPIs benefitted them.

Research Questions

This study attempted to answer the following questions:

Quantitative Studies

AQ2

1.Do students in the experimental group show (a) significant personal improvements in (i) Positive Emotions, (ii) Negative Emotions, (iii) Engagement, (iv) Relationships, (v) Meaning, (vi) Accomplishment, (vii) Happiness, (viii) Overall Well-Being and (ix) Student Life Satisfaction and (b) significant group differences when compared with students in the control group, after the happiness mentoring programme?

Hypothesis (1a) The experimental group will report a significantly lower level of Negative Emotions and significantly higher levels of Positive Emotions, Engagement, Relationships, Meaning, Accomplishment, Happiness, Overall Well-Being and Student Life Satisfaction, after the happiness mentoring programme, at post-test.

Hypothesis (1b) The experimental group will report a significantly lower level of Negative Emotions and significantly higher levels of Positive Emotions, Engagement, Relationships, Meaning, Accomplishment, Happiness, Overall Well-Being and Student Life Satisfaction, after the happiness mentoring programme, than the control group at post-test.

Qualitative Studies

2.Which PPI(s) were popular amongst students in the experimental group?

3.How do the popular PPIs benefit students in the experimental group?

Method

Participants

This pilot study involved a quasi-experimental design with convenient sampling of all full-time students in one polytechnic in Singapore. Polytechnics in Singapore are post-secondary government educational institutions preparing students for the workforce or university studies through a 3-year diploma course. The polytechnic selected for this pilot study had a total population of about 13,600 full-time students and offered over 60 diplomas in six different faculties, namely Applied Science, Business, Design, Engineering, Humanities and Social Sciences and Informatics and Information Technology. Of the total full-time student population, 7,130 were male (52.46%) and 6,462 female (47.54%). In terms of nationalities, 12,278 students were Singapore Citizens (90.33%), 639 Singapore Permanent Residents (4.70%) and 657 foreigners (4.97%). There were no reported data in terms of ethnicity for that polytechnic.

All full-time students at the polytechnic were invited to participate in the HMP via email; 47 students came to the briefing session; and only 27 indicated they were available and agreed to participate in the scheduled weekly sessions for the 10-week duration of the programme; these students constituted the experimental group. The remaining 20 students who either preferred not to participate in the programme or could not commit to its full duration constituted the control group. As such, there was no random assignment of the participants to either groups; however, both groups answered the initial pre-test survey at the end of the briefing session.

From the 27 students enrolled in the experimental group, seven dropped out of the programme at various stages and did not complete the programme. As such, the experimental group comprised 20 students who completed the programme. These were 11 females and nine males, aged between 17 and 21 years (M = 18.65), with 13 Chinese, five Malay and two of other ethnicities. They studied under the faculties of Applied Science (2), Business (4), Design (2), Engineering (4), Humanities and Social Sciences (1) and Informatics and Information Technology (7). The respondents' nationalities were 18 Singaporeans and two Singapore Permanent Residents.

Of the 20 students who were enrolled in the control group, six dropped out and did not answer the post-test survey. As such, the control group comprised 14 students who did not participate in the HMP but took the survey twice in 10-week interval. The 14 students in the control group consisted of 11 females and three males, aged between 17 and 21 years (M = 19.07), with seven Chinese, three Malay, one Indian and three of other ethnicities. They studied under the

faculties of Applied Science (2), Business (2), Design (2), Engineering (5), Humanities and Social Sciences (1) and Informatics and Information Technology (2). The respondents' nationalities were 12 Singaporeans and two foreigners.

Procedures

Ethics approval was obtained from the Institutional Review Board of the Polytechnic at which this study was conducted. All participants were informed of the possibility to withdraw from the programme at any time. Parental consent and student assent were collected in separate forms. No compensation, whether monetary or academic, was provided. Both experimental and control groups of students took the same pre-test survey in week 1 of the programme and the post-test survey at the end of week 10.

Students who responded to the HMP information email sent to all the full-time students at the polytechnic and who indicated their interest in participating in the programme were contacted individually and invited to attend the first session of the programme, which consisted of a briefing session. The committed participants then attended the HMP lessons weekly with the mentor for 10 weeks. The first author played the role of the mentor. He planned and conducted the weekly sessions. At the beginning of each session, the mentor conducted a debriefing on the participants' experiences with the activities in the previous week, followed by an elaboration on a specific element of the PERMA model (Seligman, 2011) and mechanisms of the selected PPIs for the week. He then coached the students in groups and individually on how to carry out the PPI activities. Students in the control group did not attend the HMP lessons but went about their normal lessons in the polytechnic.

In addition, students in the experimental group answered open-ended survey questions and were interviewed in groups for 30 min by the mentor to report on the popular PPIs they had used and how these PPIs benefitted them specifically.

The HMP Intervention Programme

The intervention for this pilot study was a 10-week programme, named the "happiness mentoring programme" (HMP), which offered a total of 10 PPIs aimed to foster well-being amongst students in the experimental group. Each of the weekly group sessions was conducted in a tutorial room for an average of 45 min during which the students in the intervention group were mentored in small groups of up to eight participants so that the individual student's voice was heard and personal concerns were addressed. Each session built on the previous week's experience, with a new element of the PERMA model introduced along with a specific matching PPI meant for an intended positive outcome. In session one,

participants were briefed about the aims of the programme and its duration, the mentoring approach that would be used for session delivery and the requirements in terms of commitment, and were asked to answer the pre-test survey which constituted the baseline data. In session two, the concept of Positive Emotions was introduced, and participants were given two PPI techniques to follow for the duration of a week. The first technique was a gratitude exercise called "Three Good Things" (Seligman, 2011), which required the participants to recall three things that went well during the day every night before going to bed. For the second technique, participants were given a list of six positive emotions (joy, interest, contentment, pride, hope and love) (Fredrickson, 2001). They then were tasked to choose one different word per day for a period of 6 days and to write down any event that occurred during the day that they felt could relate to the word they had chosen in order to raise their awareness on positive emotions happening to them on a daily basis. In session three, participants were given two tasks to accomplish related to the concept of Relationships. The first task was to write and send or give an "Appreciation Note" to at least one person who had a special importance to them (Seligman, 2011). The second task was the "Gift of Time" exercise (Gander et al., 2012) in which participants were asked to identify at least one person they cared about and to plan, within the given week, an activity for and with that person to spend time together. In session four, related to Engagement, participants were asked to use the "Wheel of Life" (Fontane-Pennock & Alberts, 2019) to self-assess whether important elements of their own lives had been neglected and devise possible actions which could improve their satisfaction with life over a 1-week period. In session five, in relation to Meaning in life, participants defined their own purpose and meaningfulness in life by identifying their character strengths. The task given to the participants was three-fold. First, participants were asked to recall a moment in their life when they felt at their best, and second, from that event, through the "VIA Classification of Character Strengths" (Niemiec, 2015), identify their signature strengths. Third, the participants were given the task to use their identified strengths in multiple ways for 1 week. In session six, focusing on Accomplishment, the first activity "One door closes, another door opens" (Brown, 2015) required the participants to reflect on past negative events which led to unforeseen positive consequences. The second activity asked participants to analyse significant past failures through a "Growth Mindset Action Plan" (Dweck, 2017), revisiting the actions they took and strategy they followed, to think through other pathways they could take to achieve their goals. In session seven, in addition to the PERMA elements covered in the previous weekly sessions, a theme on altruism and empathy—not specifically addressed in PERMA—was included in the HMP; the reason being that altruistic acts of kindness are PPIs that have been reported to increase well-being (Otake et al.,

2006). In this session, participants were asked, with the "counting kindnesses intervention" (Otake et al., 2006), to record on each day, the act(s) of kindness that they performed for others for an entire week. In session eight, participants revisited the various PPIs they had gone through since the start of the programme. Individually, they reflected and identified those activities they felt impacted them the most, and how the activities benefited them, and were requested to plan how they might want to continue to commit to those PPIs that appeared to nurture their well-being. In session nine, participants were asked to highlight how the HMP had helped nurture their well-being and how, to some extent, they had noticed any personal change(s) overtime. They were asked to mention the differences they had observed in themselves and, building on session eight's reflections, to list the tools, tips and tricks they had learnt along the way that could help sustain their happiness in the long term. In the last week of the programme, session 10, the mentor thanked the participants for committing to the HMP and requested them to answer the post-test survey and to provide through an open-ended survey and structure interviews feedback on their overall experience, particularly on what impacted them the most and how they had benefited from the programme. The participants in the control group were sent an e-mail with a link and were instructed to complete the post-test survey during the same week.

Instrumentation

A 31-item survey was developed specifically for this study to measure the well-being of the polytechnic students. The newly developed survey adapted 24 items from the PERMA-Profiler questionnaire (Butler & Kern, 2016). Additionally, four items were sourced from the EPOCH Measure of Adolescent Well-being (Kern et al., 2016), one item from the Children's Hope Scale (Snyder et al., 1997), one item from the Gratitude Questionnaire (McCullough et al., 2002) and one item from the Satisfaction with Life Scale (Diener et al., 1985). The survey deployed a 5-point Likert scale to allow the participants to express the extent to which they agree or disagree with each statement. It included components about school life and was worded to suit teenagers.

An online survey (n = 2,511) was conducted to determine its psychometric properties. It needs to be noted that students in the experimental and control groups were part of the online survey. As such it was assumed that the data from the experimental and control students came from a normal distribution. The overall reliability or Cronbach alpha of the survey was .92. The Cronbach's alphas of the subscales ranged from .64 to .94. These were consistent in the moderate to high range at pre-test or at post-test, except for the Negative Emotions subscale that ranged from .56 to .69.

The Pearson correlations between the nine variables in the subscales of the survey were calculated. Strong and significant correlations (.86–.90) exist between the variable of Positive Emotions and the three variables of Happiness, Overall Well-Being and Student Life Satisfaction. Strong and significant correlations (.80–.83) were also found between the two variables of Meaning and Accomplishment and the two variables of Overall Well-Being and Student Life Satisfaction. In addition, all the variables were negatively and significantly correlated with the variable of Negative Emotions. Overall, the results showed that the six PERMA variables were moderately to strongly (.46–.90) correlated with each other and with the variables of Happiness, Overall Well-Being and Student Life Satisfaction in the large sample in the online survey, indicating that the newly devised survey was a valid measure of PERMA.

Open-Ended Feedback Survey with Interviews

At the end of the programme, in addition to the post-test survey, the experimental group of participants were asked to give written feedback about their programme experiences. The feedback form consisted of seven open-response items including three closed-ended questions and four open-ended questions. They were briefly interviewed while they completed the survey. This allowed the participants to express their liking or preferences for particular aspects of the programme, their personal learning, their suggestions for improvement and their intent to recommend the programme to their peers.

Data Analyses

The pre-test and post-test data collected using the survey for both the experimental and control groups were analysed using the Statistical Package for the Social Sciences (SPSS) version 25.

To check for between group differences, independent *t*-tests were used to compare the dependent variables for the experimental and control groups at pre- and post-test. Effect sizes in terms of Cohen's *d* were also calculated as the sample sizes were small. To check for within-group differences, which reflected intra-personal development, the pre- and post-test data for each group were compared using paired *t*-tests; this would check for maturation effect, if any. Maturation effect is the biological or psychological growth in a person with a passage of time (Lewis-Beck et al., 2004). In addition, Pearson correlations were calculated to check for significant associations between PERMA variables and Happiness, Overall Well-Being and Student Life Satisfaction.

For the open-ended questions of the feedback survey, the first and second authors coded the students' responses manually and independently. The inter-

rater reliability (IRR) for coding the themes ranged from .80 to 1.0, with an overall IRR of .91. When coding discrepancies occurred, the two authors evaluated and discussed the differences until they came to an agreement on the final interpretation of the data. For the question on the PPIs preferred by the participants, an IRR coefficient of 0.97 was found; and for the question on how the participants benefitted from the HMP, an IRR coefficient of 0.85 was found, indicating a strong agreement level between coders (McHugh, 2012).

Findings

Descriptive Statistics

Average scores and standard deviations for each PERMA element, Happiness, Overall Well-Being and Student Life Satisfaction for both the experimental and the control group were calculated. They are presented in Table 1 along with the mean scores for the online survey used to establish its psychometric properties.

Table 1

Means and standard deviations for the PERMA elements, Happiness, Overall Well-Being and Student Life Satisfaction for the participants of the online survey (n = 2,511), the experimental group (n = 20) and control group (n = 14) at pre- and post-tests

	Pre-test		Post-test	
	M	***SD***	***M***	***SD***
Positive Emotions				
Online survey	3.25	.75	-	-
Experimental group	3.00	.60	3.67	.59
Control group	3.02	.42	3.45	.59
Negative Emotions				
Online survey	3.30	.71	-	-
Experimental group	3.28	.65	2.71	.66
Control group	3.52	.53	2.90	.75
Engagement				
Online survey	3.46	.60	-	-
Experimental group	3.44	.59	3.85	.71
Control group	3.50	.59	3.70	.64

	Pre-test		Post-test	
	M	***SD***	***M***	***SD***
Relationships				
Online survey	3.76	.80	-	-
Experimental group	3.48	.58	3.95	.57
Control group	3.40	.71	3.98	.73
Meaning				
Online survey	3.29	.91	-	-
Experimental group	3.23	.76	3.76	.67
Control group	2.78	.89	3.21	1.01
Accomplishment				
Online survey	3.27	.72	-	-
Experimental group	3.20	.69	3.66	.64
Control group	3.07	.48	3.34	.86
Happiness				
Online survey	3.39	.83	-	-
Experimental group	3.30	.66	3.81	.63
Control group	3.38	.56	3.74	.73
Overall Well-Being				
Online survey	3.40	.60	-	-
Experimental group	3.27	.52	3.77	.54
Control group	3.18	.48	3.54	.70
Student Life Satisfaction				
Online survey	3.23	.76	-	-
Experimental group	3.21	.62	3.68	.62
Control group	2.98	.55	3.30	.86

Quantitative Effects Within Group

To determine within group differences, paired *t*-tests were calculated for each group. To control for family wise error, Bonferroni corrections were calculated and applied to the results of the paired *t*-tests.

Experimental Group

The results of the paired *t*-tests for the experimental group show significant differences between pre- and post-test means for all nine variables at $p < .01$. These are Positive Emotions ($t(19) = 4.76$, $p < .01$, $d = 1.12$), Negative Emotions ($t(19) = -2.86$, $p \leq .01$, $d = -.86$), Engagement ($t(19) = 3.34$, $p < .01$, $d = .63$), Relationships ($t(19) = 3.24$, $p < .01$, $d = .81$), Meaning ($t(19) = 3.00$, $p < .01$, $d = .73$) and Accomplishment ($t(19) = 2.96$, $p < .01$, $d = .68$), as well as the variables of Happiness ($t(19) = 3.40$, $p < .01$, $d = .80$), Overall Well-Being ($t(19) = 4.37$, $p < .01$, $d = .92$) and Student Life Satisfaction ($t(19) = 3.21$, $p < .01$, $d = .76$). Table 2 shows a summary of these findings. The effect sizes, calculated using Cohen's *d*, were found to be large for five variables of Positive Emotions, Negative Emotions, Relationships, Happiness and Overall Well-Being and medium for four variables of Engagement, Meaning, Accomplishment and Student Life Satisfaction. These results seemed to suggest that the happiness mentoring programme had positive effects *within* the experimental group's PERMA variables, Happiness, Well-Being and Student Life Satisfaction.

Table 2

~~*Results of paired samples t-tests, between pre- and post-test data, for the experimental group (n = 20) and the control group (n = 14) for the PERMA variables and for the variables of Happiness, Overall Well-Being and Student Life Satisfaction*~~

Dependent variables	*t*	*df*	*p**	Cohen's *d*
Positive Emotions				
Experimental group	4.76	19	.00	1.12
Control group	4.84	13	.00	.83
Negative Emotions				
Experimental group	-2.86	19	.01	-.86
Control group	-3.79	13	.00	-.96
Engagement				
Experimental group	3.34	19	.00	.63
Control group	1.35	13	.20	---
Relationships				
Experimental group	3.24	19	.00	.81

*Bonferroni correction applied .05/2 = adjusted significance level ≤ .025

Dependent variables	*t*	*df*	*p**	Cohen's *d*
Control group	3.56	13	.00	.80
Meaning				
Experimental group	3.00	19	.01	.73
Control group	2.18	13	.05	.45
Accomplishment				
Experimental group	2.96	19	.01	.68
Control group	1.48	13	.16	---
Happiness				
Experimental group	3.40	19	.00	.80
Control group	3.38	13	.01	.61
Overall Well-Being				
Experimental group	4.37	19	.00	.92
Control group	3.32	13	.01	.55
Student Life Satisfaction				
Experimental group	3.21	19	.01	.76
Control group	1.98	13	.07	---
*Bonferroni correction applied .05/2 = adjusted significance level ≤ .025				

Control Group

The results of paired *t*-tests for the control group show significant differences between pre- and post-intervention means for five of the nine variables at $p < .01$. These were Positive Emotions ($t(13) = 4.84$, $p < .01$, $d = .83$), Negative Emotions ($t(13) = -3.79$, $p < .01$, $d = -.96$) and Relationships ($t(13) = 3.56$, $p < .01$, $d = .80$), as well as the variables of Happiness ($t(13) = 3.38$, $p < .01$, $d = .61$) and Overall Well-Being ($t(13) = 3.32$, $p < .01$, $d = .55$). Effect sizes, calculated using the Cohen's *d*, were found to be large for three variables of Positive Emotions, Negative Emotions and Relationships and medium for two variables of Happiness and Overall Well-Being. Table 2 depicts the scores for each dependent variable.

The significant positive gains or loss reported on five variables might be attributed to maturation effects for the students in the control group who did not attend the intervention programme.

Comparisons of Effects Within Groups

While the experimental group reported significant within group effects for all variables, gains for eight variables and loss for one variable (Negative Emotions) over the duration of the study, the control group reported significant effects for only five variables. The control group did not show significant within group improvements in Engagement, Meaning, Accomplishment and Student Life Satisfaction. This seemed to imply that participants in the intervention programme made significant personal increments or growth in the areas of Engagement, Meaning, Accomplishment and Student Life Satisfaction if maturation effects shown by the control group were taken into account. Thus, hypothesis 1a was accepted.

Quantitative Effects Between Experimental and Control Group

Results of independent *t*-tests showed no significant differences between the experimental and the control groups *before* the intervention for all nine variables. Independent *t*-tests applied to post-intervention data showed no significant differences on the PERMA, Happiness, Overall Well-Being or Student Life Satisfaction variables for the two groups either, although it is noted that the experimental group had higher means, though not significant, in Positive Emotions, Engagement, Meaning, Accomplishment, Happiness, Overall Well-Being and Student Life Satisfaction and lower mean in Negative Emotions. Hypothesis 1b was rejected.

Qualitative Findings

Popular PPIs

The structured interviews at post-intervention seemed to suggest that out of the 10 proposed PPIs in the HMP, specific strategies were more impactful than others and hence favoured by the students in the experimental group. About 70% of the students reported that they aimed to continue using at least two strategies they had learned from the HMP. The popular PPIs mentioned by the students which they found more effective to sustain their happiness and which they would turn to in the future when facing difficult times are described below in order of the students' preferences.

Strategy to Foster Accomplishment and Challenge Past Failures

AQ3

Cited by 40% of the participants, this PPI activity, based on the "Growth Mindset Action Plan" (Dweck, 2017), required the participants to recall failures they encountered in the past, analyse what did not work so that they could learn from this experience and devise a new action plan they could implement.

Strategies to Build Relationships Cited by 35% of the participants, two PPI activities of "Appreciation Note" (Seligman, 2011) and "Gift of Time" (Gander et al., 2012) required the participants to either write a note and pass it to someone special or to spend time with a special person. These strategies aimed at strengthening important relationships.

Strategies to Strengthen Positive Emotions Cited by 25% of the participants, the first PPI activity, "Three Good Things" (Seligman, 2011) (25% of the participants), was to write a daily gratitude journal recalling three positive events that occurred during the day. The second PPI activity, "Positive Emotions" (Fredrickson, 2001) (25% of the participants), required the participants to take note of positive emotions arising during the day and to make a list of those emotions.

Strategy to Enhance Engagement and Set Personal Priorities Cited by 25% of the participants, this PPI involved the "Wheel of life" (Fontane-Pennock & Alberts, 2019); participants were asked to identify areas of special interests which they would like to focus on in life.

The notes from the interviews revealed that students in the experimental group had been more sensitive to the PPI activities that promoted Accomplishment, Relationships, Engagement and Student Life Satisfaction amongst the 10 PPIs in HMP intervention. This finding seemed to support the finding from comparing within group differences, with three similar significant variables of Accomplishment, Engagement and Student Life Satisfaction. In addition, there was a preference for PPIs that fostered Positive Emotions. This was in line with parts of the findings in the quantitative study. The variable of Student Life Satisfaction was found to be strongly correlated to both Positive Emotions (.86) and Accomplishment (.88). In fact, these two elements of the PERMA model had the strongest correlation to the Student Life Satisfaction variable when compared to other elements of the PERMA model.

Benefits of the Popular PPIs

The qualitative findings indicated that the HMP had generally enhanced the development of happier selves for students in the experimental group. Specifically, the intervention programme seemed to have helped students in the experimental group to augment knowledge and skills in attaining positive mindsets and provided them with strategies which helped build bonds with people and better deal with their environment. The themes from the notes of the interview that emerged as beneficial were as follows:

Awareness of the Happy Self Eighty-five percent of the participants reported an increase in positive emotions within the self, in self-knowledge, especially knowledge of their own happiness and what made them happy.

Awareness of Others Fifty percent of the participants reported a greater attentiveness to their environment and surroundings, including the people around them and how these events/people influenced their happiness.

Living Better Fifty percent of the participants reported having emotions that are more positive, were more optimistic and cultivated a more positive outlook in life.

Self-Regulation or Self-Control Fifty percent of the participants reported to have an ability to distinguish between elements that one could control and those that one needs to accept and adapt to.

Acquired Strategies to Happiness Twenty percent of the participants reported having cognition and access to an array of happiness fostering tools or strategies that could help them deal with different states of mind or situations.

Finally, all the participants found the programme to be beneficial (60% strongly agreed and 40% agreed), with 65% strongly agreeing and 35% agreeing that they would recommend the HMP programme to their peers. All in all, participants reported being rather satisfied with the mentoring programme, with 70% strongly agreeing and 30% agreeing.

Discussion

Transition to adulthood is a particularly challenging period for students in their late teens, with polytechnic students being more vulnerable than their peers in other educational institutions (National Youth Council, 2018). Literature shows that PPIs programmes have effectively helped students improve happiness, well-being and academic results (Datu, 2018; Leskisenoja & Uusiautti, 2017; Lyubomirsky et al., 2011). This pilot study, based on the PERMA model (Seligman, 2011) attempted to test the effects and document the benefits of multiple PPIs delivered in the context of a mentoring programme for a small sample of polytechnic students in Singapore. It also identified the popular interventions amongst the participating students.

Students in the experimental programme had shown statistically significant personal improvements in all *nine* variables of the study. It needs to be noted that having significantly lower levels of negative emotions is considered a personal improvement. Negative Emotions of the experimental group was significantly decreased with a strong effect size ($t(19) = -2.86$, $p <$

.01, $d = -.86$). The personal improvements had particularly strong effects for Positive Emotions, Relationships, Happiness, Overall Well-Being and Student Life Satisfaction and moderate effects for Engagement, Meaning and Accomplishment. This shows that the HMP was effective in bringing about significant personal growth in the PERMA elements, Happiness, Overall Well-Being and Student Life Satisfaction. These results are consistent with prior research conducted in educational contexts that utilised the PERMA framework (Adler, 2016; Kern et al., 2015; Le, 2016; Lim, 2007; Seligman et al., 2009; Senf & Liau, 2013; Tay, 2013). Nonetheless, the HMP intervention needs to be replicated with larger sample sizes before these preliminary findings could be generalised, for the control group had also reported significant personal improvements but in only *five* variables.

Although no statistically significant differences were reported between the experimental and the control groups in the dependent variables at pre- and post-intervention despite the use of multiple PPI activities, the experimental group did report higher but non-significant means than the control group in seven variables of Positive Emotions, Engagement, Meaning, Accomplishment, Happiness, Overall Well-Being and Student Life Satisfaction and lower (but not statistically significant) means than the control group in Negative Emotions and Relationships at the end of the intervention. This is evident from Table 2. Throughout the literature on PPIs built around PERMA (Fredrickson, 2000; Gander et al., 2012; Otake et al., 2006; Peterson & Seligman, 2006; Seligman, 2011), when no significant differences between the experimental and the control groups were reported at baseline, participants in the experimental group had reported significant improvements in the levels of happiness and well-being at post-test, after the completion of the PPIs when compared to the control group. When the control group had no assigned placebo intervention (Senf & Liau, 2013), much less changes within the control group were observed (Lyubomirsky et al., 2011; Seligman, 2011; Sin & Lyubomirsky, 2009). However, Mongrain and Anselmo-Matthews (2012) in their research found placebo interventions for control groups to have an impact on the well-being of the participants. While the control group in this study might have grown happier over the period of the study, reporting a non-significant improvement in their levels of happiness and well-being, it is possible that answering the survey questionnaire on happiness and well-being might have triggered self-reflection leading to self-improvement. The participants in the control group could have been sensitised to the idea of happiness at pre-test. This could have made the students feel “good” which in turn improved their reported well-being. Alternatively, participants in the control group could have matured over time, been able to deal with life events better and had thus become happier.

The non-significant statistical differences between groups at post-test might also be attributed to the small sample size and the lack of rigour of the PPI activities. The study assumed that PPI activities taught had been completely carried out by the participants. This might not have been the case. As polytechnic students had heavy study schedules and some worked on part-time jobs, they might not have had time to practise the PPIs after attending the weekly sessions. As such, effects of the HMP between groups could not be established. Lyubomirsky et al. (2011) in a longitudinal study had observed that for PPIs to be effective, participants must have sufficient motivation, commitment and conviction so that the intervention could work in their favour.

All students in the HMP reported personal benefits. The majority had augmented self-knowledge especially in their positive emotions and gained a heightened awareness of others. They had become more positive and optimistic, accepting and adapting to life events and had practised the use of PPI strategies/tools that enhance their happiness. The students' ability to know what would make them happy could certainly reduce existential ennui or boredom (Gosline, 2007/2008) and enable them to lead a more fulfilled life. These findings would help the polytechnic in planning for better well-being mentoring programmes that involve PPIs.

The findings of the structured interviews and open-ended survey questions provided additional insights on the post-test results. The more popular PPIs in order of preference (from the more popular to the less popular) were related to PERMA variables of Accomplishment (in relation to overcoming and challenging past failures), building Relationships, strengthening Positive Emotions and enhancing Engagement and setting personal priorities. The specific PPI activities are, firstly, "Growth Mindset Action Plan" (Dweck, 2017) which aimed at revisiting past failures to learn and develop new pathways to success. Through this PPI, participants built resilience by recognising that failure was part of a learning process and that they could use multiple strategies to reach their goals. This PPI helped to boost confidence and build hope in the polytechnic students who had to struggle with many setbacks and failures in life. Second in popularity were two PPI activities of "Appreciation Note" (Seligman, 2011) and "Gift of Time" (Gander et al., 2012), indicating that the students were appreciative of and keen to spend time with loved ones. Two PPI activities in the third place were "Three Good Things" (Seligman, 2011) and "Positive Emotions" (Fredrickson, 2001) for the students to cherish happy moments. The last popular PPI activity was the "Wheel of Life" (Fontane-Pennock & Alberts, 2019) that allowed participants to assess if important things in their life had been neglected and/or to identify matters they had excessively invested their time in.

This activity allowed the participants to select elements of their life where satisfaction was low and devise possible actions to improve their satisfaction. It was basically related to engaging in meaningful tasks that brought about life satisfaction. Future researchers when providing PPIs for polytechnic students may like to include activities that help the students deal with failures and hence achieve success, build relationships, and plan for happy and meaningful activities that enhance life satisfaction.

This pilot study indicates that the intervention, the happiness mentoring programme, had enhanced and hastened the development positive emotions or happiness and self-knowledge in a small group of polytechnic students who self-selected themselves into the programme, compared with the maturation of the control group. Personal gains of the students were significant and in the right directions, with positive attributes augmented and negative attribute reduced. Mentoring and coaching the students through the actual process of implementation of positive psychology interventions into their life appeared to be the right move as young adults, like the polytechnic students, reported benefitting from it. The students favoured PPIs that helped them to foster accomplishment and to overcome setbacks, failures and challenges. They were more aware of what made them happy, who made them happy, how to be happy and had acquired PPI strategies to be happy at different states of mind and in different situations. This study, when modified with the popular PPIs which could be coached more thoroughly, appeared to have potential to benefit more polytechnic students who need support and guidance, grappling to grow into adult life. The study should perhaps be tracked over a few years for the benefits of the intervention to be truly manifested and realised or replicated with a larger sample.

Publisher's Note

Data Availability

The datasets generated for and analysed during the current study are available from the corresponding author on reasonable request.

Declarations

Ethics Approval It needs to be noted that this research study was conducted as part of a Master-in-Education (Developmental Psychology) programme at a Singapore university where the first author was pursuing his postgraduate degree. Ethics approval was obtained from the University's IRB.

Consent to participate Informed consent was obtained from all individual participants included in the study.

Conflict of interest The authors declare no competing interests.

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