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Abstract

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Keywords

Academic performance, approaches to studying, cross-cultural study, grade point average, higher education

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Associations between Occupational Therapy Students' Approaches to Studying and Their Academic Grade Results: A Cross-Sectional and Cross-Cultural Study

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ABSTRACT

Students' approaches to studying are generally viewed as essential for their learning outcomes and are often described as being either deep, strategic or surface. However, research on associations between study approaches and academic outcomes among occupational therapy students are rare, as are studies that include cross-cultural comparisons. The objective of this study was to assess the degree to which the deep, strategic, and surface approaches to studying were associated with occupational therapy students' grade point average, in the total sample and when stratified by country, while controlling for age, gender and time spent on independent study. Seven hundred and twelve students from four countries (Australia, Norway, Hong Kong, and Singapore) completed the Approaches and Study Skills Inventory for Students, and sum scores were calculated for the deep, strategic, and surface scales. Linear regression analyses were used to investigate associations between scale scores and grade point average, in the total sample and within each of the four sub-samples. The results showed that in the total sample, and in the Australia and Singapore sub-samples, none of the scales was associated with grade point average. In Hong Kong, lower deep approach scores and higher strategic approach scores were associated with higher grade point average. In Norway, higher strategic approach scores and lower surface approach scores were associated with higher grade point average. The study found that the approaches to studying scales were relevant for understanding academic performance among occupational therapy students in Norway and Hong Kong, but appeared less useful in the Australian and Singapore contexts.

INTRODUCTION

It is generally assumed that students' learning process affects their subsequent learning outcomes and study results. The concept of "approaches to studying" builds strongly on the work of Entwistle and colleagues (Entwistle, 2007; Entwistle & McCune, 2004; Entwistle & Ramsden, 1983; Entwistle, Tait, & McCune, 2000; Tait & Entwistle, 1996; Tait, Entwistle, & McCune, 1998), and denotes that students have more or less distinct ways of organizing their study behaviors. Three main approaches to studying have been identified: *deep*, *surface*, and *strategic* approaches (Tait et al., 1998). The *deep* approach focuses on connecting ideas and seeking a personalized, comprehensive understanding of the study materials. The *surface* approach, on the other hand, focuses on rote learning in an attempt to remember facts and pieces of information, and often implies being less concerned with the bigger picture. The third type, the *strategic* approach, is predominantly oriented towards achievement and success on formal assessment occasions (Tait et al., 1998).

Across professional fields, students who are inclined to employ deep and strategic approaches to studying have generally received better grades in comparison to students who are more prone to use the surface approach (Diseth & Martinsen, 2003; Kusurkar, Ten Cate, Vos, Westers, & Croiset, 2013; Mattick, Dennis, & Bligh, 2004; Richardson, Abraham, & Bond, 2012; Salamonson et al., 2013). Similar associations with grade point average (GPA) have been found in previous research involving health care students (Brodersen, 2007; May, Chung, Elliot, & Fisher, 2012; Reid, Evans, & Duvall, 2012; Ward, 2011a, 2011b). Moreover, higher scores on the deep and strategic approaches to studying have been linked with better clinical examination outcomes and better performance on fieldwork placements (Healey, 2008; Tiwari et al., 2006). However, there has been little research concerned with occupational therapy students' approaches to studying.

This study of occupational therapy students is part of a larger cross-cultural research project. Previously published work resulting from the larger project has shown both similarities and differences in the study approaches reported by occupational therapy students from Australia, Norway, Hong Kong, and Singapore (Brown et al., 2017). Moreover, one study revealed that five of the 13 study approach subscales were directly associated with the students' GPA, but not always in the expected direction (Bonsaksen, Brown, Lim, & Fong, 2017). For example, among the deep approach subscales, higher scores on "seeking meaning", but lower scores on "interest in ideas", were associated with higher GPA. Considering this, investigating the associations between the three broadly defined approaches to studying and the students' GPA is warranted. The previously established associations between the Approaches and Study Skills Inventory for Students (ASSIST) subscales and students' GPA were also based on aggregated data from the total sample. Given that the students in the four countries demonstrated statistically significant differences on the strategic and surface approaches to study and on several of the ASSIST subscales (Brown et al., 2017), there is reason to examine whether associations between occupational therapy students' approaches to studying and GPA differ between countries.

Research that seeks to establish the strength of association between selected variables should consider possible confounding or intervening factors, and in this study, we adjusted for the effects of study age, gender and number of hours dedicated to studying. Previous studies have reported that older students tend to achieve better academic outcomes, compared to younger ones (Duckworth & Seligman, 2006; Richardson et al., 2012; Zeegers, 2001). In addition, a review and meta-analysis concluded that female students in higher education achieve somewhat better academic outcomes compared to their male counterparts (Richardson et al., 2012), although other studies have been less conclusive on this topic (Ballantine, Duff, & Larres, 2008; Salamonson et al., 2013; Severiens & Dam, 1998). Moreover, one should consider that a pure quantitative measure of study efforts – the number of hours spent studying – in and of itself may have an impact on grades, as previously suggested (Brown et al., 2017).

In summary, much of the empirical evidence suggests that approaches to studying are important for students' academic performance, as commonly measured with their GPA. However, approaches to studying and their associations with academic outcomes among occupational therapy students is an under-researched area of investigation, and comparisons between countries are sparse. The present study addresses these shortcomings in the existing education research literature.

The objective of the current study was to examine the degree to which the deep, strategic and surface approaches to studying (as measured by the ASSIST) were associated with occupational therapy students' GPA, in the total sample and when stratified by country, after controlling for age, gender and time spent on relevant self-study.

METHODS

Design and Settings

We used a cross-sectional study design with students from Australia, Norway, Hong Kong, and Singapore recruited as participants. The education programs in the four countries were of different length. In Australia and Hong Kong, the entry-to-practice education program is four years full-time while in Singapore and Norway it is three years full-time. All education programs were at the undergraduate level and all met the accreditation standards set by the World Federation of Occupational Therapists.

Participants and Recruitment

There were no criteria for exclusion. Inclusion in the study was based on 1) enrollment in one of the occupational therapy education programs involved in the study; and 2) informed consent to participate was provided. A non-teaching member of staff distributed the questionnaires to the participating students during breaks in classrooms. The data were collected in 2015.

Measurement

Academic performance was operationalized as the students' current GPA at the time of the data collection. In Australia and Singapore, GPA scores were directly derived from academic course or unit results: $\leq 49\%$ = grade 1, 50-59% = grade 2, 60-69% = grade 3, 70-79% = grade 4, 80-89% = grade 5, and $\geq 90\%$ = grade 6. In Norway, GPA was based on the established descriptors of grades (The Norwegian

Association of Higher Education Institutions, 2011): fail = 1, sufficient = 2, satisfactory = 3, good = 4, very good = 5, and excellent = 6. In Hong Kong, the GPA was computed based on the grade point of all the subjects taken by the student up to and including the latest semester and was capped at 4.0. The GPA for Hong Kong students that was out of a maximum score of 4.0 was then converted to an equivalent score on a six-point scale for consistency between the four student groups. Thus, by multiplying the actual grade with 6/4, the grade scale in Hong Kong was transformed into a 1-6 scale so that the different sets of classification ratings for academic results were deemed equivalent and comparable. Age, gender and number of hours spent self-studying during a typical week were also self-reported.

The students' approaches to studying were assessed with the 52-item version of the Approaches and Study Skills Inventory for Students (ASSIST). The English version of the ASSIST (Tait et al., 1998) was used with the students in Australia, Hong Kong, and Singapore, whereas the students in Norway completed the Norwegian version (Diseth, 2001). On each item, the student indicates his or her level of agreement on a 1-5 Likert type scale, representing the continuum from 'disagree' to 'agree'. The ASSIST items are organized under three main factors that make up the *deep*, *strategic*, and *surface* approach scales (Byrne, Flood, & Willis, 2004; Entwistle et al., 2000; Reid, Duvall, & Evans, 2005). Each of the main scales consists of several subscales, but only the three main scales were used in this study. Scale scores were produced by summarizing the individual's scores on the relevant items constituting each scale. The English version of the ASSIST scales has been used with students in different disciplines and has demonstrated satisfactory internal consistency (Cronbach's α ranging 0.61-0.88) and construct validity (Ballantine et al., 2008; Brodersen, 2007; Brown, Wakeling, Naiker, & White, 2014; Byrne et al., 2004; Reid et al., 2005). Three latent factors have similarly been found with the Norwegian ASSIST version (Diseth, 2001), and internal consistency has been satisfactory for each of them (Cronbach's α ranging 0.70-0.81). In addition to the ASSIST, information regarding the students' age group, gender and independent study efforts (i.e., time spent on self-study) were collected.

Data Analysis

Sample size was not specified prior to the study. However, a necessary sample size to be used in a multivariate analysis with six independent variables (as performed in the current study) would be approximately 60 participants (Field, 2005), which was exceeded in all of the performed analyses. All scale scores were computed provided there were less than 20% missing on the relevant items. Crude differences between countries were examined with Chi Square statistics (nominal level variables) and one-way analysis of variance (interval level variables). The main analysis was the linear regression analysis used to assess independent associations between GPA and six variables introduced in two hierarchical blocks: Block 1) age group, gender, and independent study efforts (i.e., average number of hours per week), and Block 2) the deep, strategic and surface scale scores derived from the ASSIST. We also assessed how much of the total GPA variance was explained with the blocks of independent variables, and the analyses were performed for the total sample and for each of the countries separately. As previous studies have noted very few differences between students in different year cohorts (Bonsaksen, Thørrisen, & Sadeghi, 2017), year cohort was not included as an independent variable for analysis.

Effect sizes (ES) were reported as standardized β weights, and $ES > 0.30$ are considered to be of medium size (Cohen, 1992). The level of statistical significance was set at $p < 0.05$. All tests were two-sided. As this study was considered exploratory, no correction for multiple testing was performed. All data were analyzed with IBM SPSS for Windows, version 24 (IBM Corporation, 2019).

Ethics

The students were informed that completion of the questionnaires was voluntary, that their responses would be anonymous, and that there would be no negative consequences from opting not to participate in the study. Approval for conducting the study was obtained from the following Ethics Review Boards/Data Protection Agencies: Monash University Human Research Ethics Committee (MUHREC; for Monash University); The Data Protection Official for Research (for Oslo Metropolitan University); The Human Subject Ethics Application Review System (HSEARS; for Hong Kong Polytechnic University); and Nanyang Polytechnic, School of Health Sciences Projects Review Committee (for Nanyang Polytechnic).

RESULTS

Participants

The questionnaires were completed by 712 students, representing 66.1 % of the total number of students at the four sites. Response rates for Australia were $n = 376/410$ (91.7%), for Hong Kong $n = 109/355$ (30.7 %), for Norway $160/245$ (65.3 %), and for Singapore $67/67$ (100 %). The participants from Australia were from all four study years (first year $n = 170$, second year $n = 77$, third year $n = 73$, and fourth year $n = 56$). The Norwegian participants were at all three year levels (first year $n = 57$, second year $n = 50$, and third year $n = 53$). The participants from Hong Kong were predominantly in the first and third study years (first year $n = 37$, second year $n = 5$, and third year $n = 23$ from the 4-years program, and third year $n = 44$ from the 3-years program). Lastly, only first year students were included in Singapore ($n = 67$).

In the total sample, the majority of the students were in the 20-24 years ($n = 416$, 58.5 %) age group, but the proportion of students in different age groups differed significantly between countries ($p < 0.001$). Similarly, the majority of participants were female ($n = 602$, 84.7 %), and the gender proportions differed significantly between countries (Hong Kong 76.1 %, Singapore 92.4 %, $p = 0.001$). On average, the participants reported that they spent 12.7 hours ($SD = 8.2$ hours) engaged in relevant self-study activities during a typical week, with large differences between the countries (ranging between Norway $M = 9.6$ hours and Singapore $M = 17.4$ hours, $p < 0.001$). The mean GPA of the total sample was 3.95 ($SD = 1.02$), indicating a 'good' level of GPA in the sample overall. However, there were statistically significant variations between the four countries with Australia ($M = 3.68$) and Hong Kong ($M = 4.49$) being significantly different ($p < 0.001$). The characteristics of the study participants are listed in Table 1.

Table 1

Characteristics of the Study Participants

Characteristics	Total sample (<i>n</i> =712)	Country of study				<i>p</i> -value
		Australia (<i>n</i> =376)	Hong Kong (<i>n</i> =109)	Norway* (<i>n</i> =160)	Singapore** (<i>n</i> =67)	
Age group (years)	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)	< 0.001
15-19	201 (28.2)	125 (33.2)	31 (28.4)	6 (3.8)	39 (58.2)	
20-24	416 (58.4)	214 (56.9)	69 (63.3)	107 (66.9)	26 (38.8)	
25-29	54 (7.6)	16 (4.3)	8 (7.3)	29 (18.1)	1 (1.5)	
30-35	19 (2.7)	8 (2.1)	0 (0.0)	10 (6.3)	1 (1.5)	
36-39	13 (1.8)	8 (2.1)	1 (0.9)	4 (2.5)	0 (0.0)	
> 40	8 (1.1)	5 (1.3)	0 (0.0)	3 (1.9)	0 (0.0)	
Gender	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)	0.001
Male	109 (15.3)	44 (11.7)	26 (23.9)	34 (21.3)	5 (7.5)	
Female	602 (84.6)	332 (88.3)	83 (76.1)	126 (78.8)	61 (91.0)	
	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	
Time spent on self-study	12.7 (8.2)	13.5 (8.8)	11.8 (7.4)	9.6 (5.4)	17.4 (8.4)	< 0.001
GPA	4.0 (1.0)	3.7 (0.9)	4.5 (1.2)	4.1 (1.2)	4.2 (1.1)	< 0.001

Note. *n* = number of participants *M*: Mean; *SD*: Standard Deviation. Time spent on self-study is the number of hours engaged in self-studying during a typical week. GPA is grade point average reported on a 1-6 scale, where 1 = fail and 6 = excellent. *The data from Norway included one missing value on the age variable. ** The data from Singapore included one missing value on the gender variable. Differences are examined with Chi Square tests (categorical variables) and the one-way ANOVA *F*-test (continuous variables).

Table 2

The Participants' Approaches to Studying

ASSIST scale	Total sample	Country of study				Difference test
		Australia	Norway	Hong Kong	Singapore	
	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>p</i>
Deep approach	56.7 (8.3)	55.9 (8.7)	57.5 (8.3)	57.6 (6.5)	57.7 (8.0)	0.06
Strategic approach	72.9 (10.5)	74.7 (10.6)	71.1 (10.0)	70.4 (9.7)	70.8 (10.5)	< 0.001
Surface approach	49.1 (8.3)	48.4 (7.6)	48.0 (8.7)	52.5 (9.0)	49.7 (8.8)	< 0.001

Note. ASSIST: Approaches and Study Skills Inventory for Students; *M*: Mean; *SD*: Standard Deviation. Differences examined with the one-way ANOVA *F*-test. Missing values varied from analysis to analysis, so the number of participants ranged between 145 and 160 (Norway) and between 108 and 109 (Hong Kong). Students from Australia and Singapore had no missing values.

Table 3

Predictors of Grade Point Average among the Participants

Independent variables	Grade Point Average				
	Total sample (<i>n</i> = 687)	Australia (<i>n</i> = 376)	Norway (<i>n</i> = 137)	Hong Kong (<i>n</i> = 108)	Singapore (<i>n</i> = 66)
1) <i>Demographics and study effort</i>	β	β	<i>B</i>	β	β
Age	0.10*	0.08	0.11	0.12	0.05
Gender	-0.05	-0.11*	-0.11	0.08	-0.39**
Time spent on self-study	0.10*	0.25**	-0.08	-0.20	0.04
Explained variance	2.6 % **	8.5 % **	3.3 %	7.0 %	17.1 %**
2) <i>Study approach scales</i>	β	β	<i>B</i>	β	β
Deep approach	0.01	-0.01	-0.14	-0.26*	-0.04
Strategic approach	0.02	0.03	0.24*	0.35**	0.13
Surface approach	-0.06	-0.07	-0.21*	-0.14	0.02
R² change	0.5 %	0.7 %	8.7 %**	8.4 %*	1.1 %
Explained variance	3.1 %**	9.1 % **	12.0 %*	15.4 % **	18.1 %

Note. Table content is standardized β weights, indicating the strength of each variable's relationship with GPA controlling for all variables in the model. Variable coding: female = 1, male = 2. For all other variables, higher scores indicate higher levels. * $p < 0.05$, ** $p < 0.01$

ASSIST Scores

The mean scores on the ASSIST scales, for the total sample and for the students in each of the four countries, are reported in Table 2. There was no overall difference between countries on the ASSIST deep scale score ($p = 0.06$), whereas significant differences between countries occurred for the ASSIST strategic and surface scales (both $p < 0.001$).

Associations with GPA

The results from the linear regression analyses are shown in Table 3. In the total sample, being older and spending more time on self-study activities were independently associated with higher GPA. None of the study approach scales was associated with GPA. The full regression model accounted for 3.1 % of the variance in GPA in the sample, a proportion to which the ASSIST scales contributed 0.5 %.

Among the students from Australia, being female and spending more time on self-study activities were associated with higher GPA. None of the study approach scales were associated with GPA. The regression model accounted for 9.1 % of the GPA variance in the Australian student sample, and the ASSIST scales contributed 0.7 % to the explained variance proportion.

Among the students from Norway, higher scores on the strategic approach and lower scores on the surface approach were associated with higher GPA. The regression model accounted for 12.0 % of the GPA variance among the students from Norway, and the proportion attributed to ASSIST scales was 8.7 %.

The data from the Hong Kong students revealed a borderline negative association between less time spent on self-study activities and higher GPA ($p = 0.05$). Lower scores on deep approach and higher scores on strategic approach were directly associated with higher GPA. Among the students from Hong Kong, the regression model accounted for 15.4 % of the GPA's variance, and the proportion of explained outcome variance attributed to the ASSIST scales was 8.4 %.

Among the students from Singapore, female gender was strongly associated with GPA, whereas our data did not reveal any independent associations between study approach scales with GPA. The full model accounted for 18.1 % of the GPA variance, with the ASSIST scales contributing 1.1 % to the explained variance. The results from the regression analyses are displayed in Table 3.

DISCUSSION

The aim of the current study was to examine possible associations between approaches to studying and academic performance, controlling for age, gender and study efforts, among occupational therapy students from four different countries. The results indicate that approaches to studying are significantly associated with academic outcomes among students in Norway and Hong Kong, but not among students in Australia and Singapore. With a view to the students from Norway and Hong Kong, their pattern of associations exhibited similarities as well as differences.

Associations between ASSIST Scale Scores and GPA

In the total sample and in three of the included countries, the ASSIST deep approach scores were not significantly associated with GPA. However, among the students in Hong Kong, lower scores on the ASSIST deep approach scale were associated with higher GPA. The general lack of associations, and in particular the negative association detected among the Hong Kong students, is in contrast to theory and much of the empirical evidence in the field (e.g., Kusrkar et al., 2013; Mattick et al., 2004; Richardson et al., 2012; Salamonson et al., 2013; Subasinghe & Wanniachchi, 2009). The evidence from previously completed studies reported that positive associations between higher deep approach scores and better exam results existed.

However, it should be noted that GPA is not a fully adequate measure of the students' learning outcomes; it is merely a measure of the students' average academic performance on a variety of individual academic courses/units that make up a student's undergraduate occupational therapy degree. Thus, we wonder whether there may be different approaches to assessment in different countries. For example, assessments in the curriculum may be geared towards assessing the student's ability to memorize knowledge and facts, or they may be more geared towards assessing the student's ability to reason independently about a clinical case. Moreover, there is a matter of 'how much assessment' – frequent student assessment in the form of exams can result in quite selective studying among students as they prepare for the upcoming exam.

Also, as found in a student survey conducted among the Hong Kong students, some students indicated that critical thinking was the least developed of their professional competencies, and that there were far more learning outcomes than could be acquired during the duration of the course of study (Szeto, Fong, Mak, & Tsang, 2012). The notion of constructive alignment (Biggs, 2003) suggests that teaching forms, teaching content and forms of assessment should be logically derived from the stated learning outcomes of a given course. In cases where the stated learning outcomes are perceived to be many and diverse, and where there is a high frequency of assessment, one might find the negative deep approach-exam grade relationship as found among the students in Hong Kong.

The ASSIST strategic approach scale was not associated with GPA in the total sample or among the students from Australia and Singapore. However, it was the strongest predictor of higher GPA among the students from Norway and Hong Kong (see Table 3). The results from the analysis of the Norwegian and Hong Kong students are in line with previously reported research, which similarly emphasized the strategic approach to studying as a means to achieving good academic outcomes (Diseth & Martinsen, 2003; Herrmann, McCune, & Bager-Elsborg, 2017; Richardson et al., 2012). In contrast, for the students from Australia (and for the total sample), spending more time on self-study was associated with higher GPA results (see Table 3). Therefore, a mere quantitative measure of "time on task" was important for the Australian students' academic results, whereas a more deliberate way of "managing the task", indicating a strategic approach to studying, was significant for the Norwegian and Hong Kong students.

The previous results from the total sample indicated that more time on self-study, but also higher scores on the ASSIST 'achieving' subscale derived from the strategic approach, were associated with higher GPA (Bonsaksen, Brown, et al., 2017). However, in view of the descriptive data in the current study (see Table 2), the students from Australia had by far the highest scores on the ASSIST strategic scale. If the scores on strategic studying were generally at a higher level among the Australian students, and with only modest variation, then it would be harder to detect an association between ASSIST strategic approach scores and GPA in this group.

The surface approach scale score was associated with GPA only among the Norwegian students. In this instance, lower surface approach scores predicted higher GPA, which is in agreement with previous findings (Herrmann et al., 2017; Richardson et al., 2012; Salamonson et al., 2013; Zeegers, 2001). However, it is apparent from this cross-cultural study that the theoretically anticipated associations between the ASSIST scales and academic performance are not always confirmed empirically in diverse samples and settings. Herrmann and colleagues (Herrmann et al., 2017), for example, found that the association between surface approach scores and exam grades varied across study programs within Denmark. In line with this reasoning, we found that the same associations also varied between countries. The associations between study approach scores and GPA may therefore depend on the learning environment, teaching styles and assessment policies and practices at different educational institutions, and on the broader cultural context within which the students are situated.

In line with previous research (Bonsaksen, Brown, et al., 2017; Duckworth & Seligman, 2006; Richardson et al., 2012), being older and spending more time on independent study were associated with higher GPA in the total sample, but with small effect sizes. The associations remained significant after controlling for the study approach scores. As such, the impact of higher age and spending more time studying are not entirely accounted for by the study approaches employed by the older and the harder-working students. Female gender was significantly associated with higher GPA only among the students from Australia and Singapore. However, the data from Australia and Singapore contained only 44 (11.7 %) and five (7.6 %) men, respectively, and inferences concerning associations with gender should therefore be made with caution.

Study Limitations

When considering the results from the total sample (the cross-cultural sample), the small number of students from Singapore and the larger number from Australia limits our ability to examine cross-cultural relevance. Similarly, unequal group sizes on other variable categories (e.g., gender) is a problem. In Singapore, only first year students were included in the sample, and in Hong Kong, only five students from the second year of study were included. We used a convenience sampling approach and employed self-report questionnaires. Convenience sampling may be a significant problem for our ability to generalize the findings, as for example, the responders may have been among the most motivated students. When using self-report scales, the issue of social desirability and biased responding by participants also needs to be considered. The

study also did not account for curriculum influences such as differences in sequence of modules, as well as types and frequency of student assessments which may impact on study approaches adopted and student performances.

Students' GPA is frequently utilized as a determination of academic ability. Given the cross-cultural study design, this measure may provide limited information given the varied differences between the groups. Furthermore, the varied places in which the students were within their curriculums, coupled with the different cultural emphasis on education, should be taken into account when interpreting the results of this study.

Future Research

There are several suggestions for future research. A similar study could be replicated with larger samples and with occupational therapy students from other cross-cultural contexts, such as the American context, where a large number of occupational therapists graduate each year. Graduate entry master's and clinical doctorate occupational therapy students could also be recruited and compared with undergraduate occupational therapy students. Likewise, occupational therapy students' approaches to studying could be compared with students from other health care professions or other academic disciplines. In view of our consideration that study approaches may partially depend on the types and frequency of assessment, as would be suggested from constructive alignment theory (Biggs, 2003), future studies may incorporate relevant aspects of the assessment procedures when considering these relationships. Finally, occupational therapy students' approaches to studying could be tracked over their enrollment to see if they change or evolve.

CONCLUSION

This study's main contribution to the field lies in its provision of data to substantiate between-country differences with regard to the theoretically assumed relationships between study approaches and students' GPA. In this study, we found that approaches to studying were significantly associated with academic performance among undergraduate occupational therapy students in Norway and Hong Kong, but not among students in Australia and Singapore. Students from Norway and Hong Kong shared a positive association between strategic studying and higher GPA. For these two countries, this pattern of associations with GPA was similar also for the ASSIST deep and the surface scales. However, higher levels of deep approach on the ASSIST were significantly associated with lower GPA among the Hong Kong students, whereas higher levels of surface approach were significantly associated with lower GPA among the Norwegian students.

In conclusion, the results indicate that scores on approaches to studying scales (such as the ASSIST) are different between occupational therapy students in different countries. In some countries, such scores have little or no impact on the students' GPA. In other countries, where such scores are associated with GPA, the nature of the association may differ according to the teaching and assessment culture of the respective country – in which important aspects include the frequency of exams, culture of education and the study material content that is assessed in them. The results do not

indicate which study approach is favorable in terms of “which approach makes the student learn more”. When the outcome is defined as GPA, the outcome is a product of the student’s learning, but only as contextualized within a particular assessment culture. Thus, a future line of research may be to investigate approaches to studying in the context of more clearly defined assessment cultures.

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