Developing Transferable Skills for the Public Good in Higher Education

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Transferable skills are crucial for undergraduates to be prepared to enter the workforce after college. Previous research has shown how effective educational approaches enhance student learning. There is, however, limited research that understands how the emphasis on transferable skills relates to the value of deep approaches to student learning. This paper analyzes how faculty emphasis of transferable skills, through analytical writing and problem-solving, is related to deep approaches to learning in higher education. Data come from a large-scale, multi-institutional study that surveys faculty at four-year institutions. Findings indicate that the intentional development of transferable skills has a positive relationship with emphases on deep approaches to learning. The study reinforces the importance of collaboration between multiple stakeholders to foster student learning.

Keywords: transferable skills, engagement, faculty, teaching

Developing students' transferable skills is crucial for higher education stakeholders and the public good. Businesses and community leaders are one of the key external stakeholders in these discussions. Their role as stakeholders in higher education must be taken seriously considering the shifting definition of a public good. The discourse of public good and higher education has been redefined as a collective private gain, which represents a shift toward "a more individualized terrain of skills for employability which can result in increased earnings and job security" (Williams, 2016, p. 629). However, employers feel that undergraduate students are not sufficiently prepared with the necessary skills to apply to the workforce after college (AAC&U, 2015). The lack of emphasis on skills that employers deem as top priorities, including the development of transferable skills, has been a long-standing criticism of higher education. This paper explores how the encouragement of transferable skills is related to deep approaches to learning in postsecondary education.

The Association of American Colleges & Universities conducted a survey and found that employers firmly believe that all students should learn how to solve a complex problem and effectively communicate in writing, but very few employers think today's college students possess these skills (AAC&U, 2015). There are several different 'generic skills' that are considered as transferable; problem solving, as an example, is a term that represents a particular competency and can vary with different tasks (Stasz, 2001). In the context of higher education, employers' desire for graduates with transferable skills warrants further action. As such, stakeholders must collaborate to assess the fostering of educationally effective learning environments. For instance, the development of student skills requires faculty to design their learning tasks to make deliberate connections to deep approaches to learning (DAL) (Nelson Laird et al., 2014). DAL encourages students to understand the underlying meaning and is

present across all disciplinary areas in higher education (Nelson Laird et al., 2008). Higher-order, integrative, and reflective learning are considered critical components of DAL which is also associated with greater student outcomes (Nelson Laird et al., 2008, Nelson Laird et al., 2014).

There is limited research specifically on the role that faculty have played in developing students' transferable skills. The importance of teaching transferable skills must be emphasized to faculty members as they are responsible for carrying out the academic curricula of an institution. The purpose of this study is to examine how faculty members' development of transferable skills in the classroom relates to other forms of effective educational practice. The guiding research questions for this study are: How do instructors encourage the development of transferable skills? Moreover, how does their emphasis on the development of transferable skills influence their values for deep approaches to learning?

Theoretical Framework

This paper is based on Biggs 3P model of teaching and learning. In his theoretical model, Briggs referred to the 3Ps as: Presage (student factors and teaching context), Process (learning focused activities), and Product (learning outcomes). Additionally, Biggs (2003) considered the intentional use of deep approaches to learning activities to be an important effect on learning outcomes. The theoretical model is shown in Figure 1.

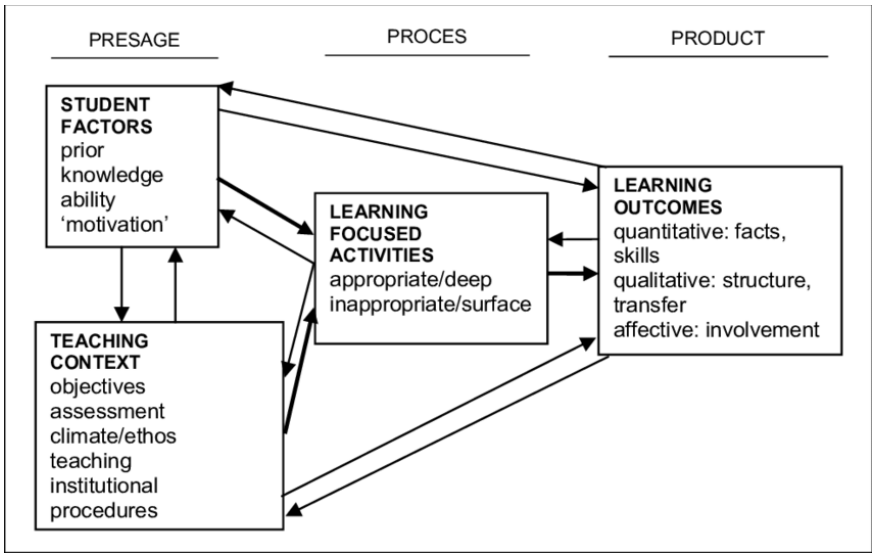

Figure 1: Biggs (2003) 3P Model

Overview of FSSE Transferable Skills Module

Our study uses data from the Faculty Survey of Student Engagement (FSSE) to analyze how encouraging the development of transferable skills is associated with other forms of effective educational practice. The FSSE is a national survey for instructional staff who teach at baccalaureate-degree granting colleges. The survey measures instructors' expectations for student engagement in educational practices that are connected to their learning and development. As part of the survey administration, institutions can include a topical module, which is a small set of questions on a specific topic. One of the topical modules available is the Transferable Skills module. This item set is adapted from the "Degrees of Preparation" survey that was previously administered by the American Association of State Colleges and Universities. Although the Transferable Skills module has been administered for several years, FSSE has not conducted an in-depth empirical analysis of the results. In addition to the topical module, the core FSSE survey includes questions that are associated with the constructs of higher-order, reflective and integrative learning (Nelson Laird, et al., 2014).

The FSSE survey asks instructors how much they emphasize different aspects related to the construct of problem-solving skills in their teaching. As an example, one questions asks during the current school year, whether course-related or not, to what extent have you encouraged students you teach or advise to discuss the ethical consequences of a course of action. The responses to this and similar questions are all on the same Likert-scale with four response options: very little (1) to very much (4). Next, instructors were asked how they emphasize the development of analytical writing skills. For instance, one question asks instructors, whether course-related or not, about how often have students you teach or advise written something (paper, report, article, blog, etc.) that assessed the conclusions of a published work. The Likert-scale is slightly different for these questions, with four response options between never (1) and very much (4). A full list of relevant survey questions and response options can be found in Appendix A. In addition, Appendix B contains the descriptive statistics for the variables in this study.

Method: Data and Analysis

This paper examines five years of FSSE data administered between 2014-2019. In total, 72 institutions administered the survey with the Transferable Skills module during this period. If an institution participated in the survey twice during this time, we only used their most recent administration. The dataset contains 9,654 faculty respondents who answered at least one of the transferable skills questions.

We used structural equation modeling as the analytical method to answer the research questions. We derived our structural model from the Biggs 3P theoretical model that provides substantive evidence regarding the relationship between teaching context and deep approaches to learning. In our case, we are considering a specific teaching context: the emphasis of

transferable skills. Thus, structural equation modeling allows us to use confirmatory factor analysis to accurately measure, and assess the reliability of, the latent constructs of problem solving (PS), analytical writing (AWS), reflective and integrative learning (RI), and higher-order learning (HO). Once the confirmatory factor analysis is complete, we simultaneously regress RI and HO on PS and AWS using robust weighted least squares (WLSMV) estimation. The WLSMV estimator is necessary, instead of Maximum Likelihood, because the measurement indicators are ordinal due to their Likert-scale response options (Bollen, 1989). Appendix C contains the covariance matrix related to this SEM analysis. Further, the conceptual diagram of the latent variable model is in Appendix D.

Our results indicate that the subscales in this study are reliable measurements of problem-solving ($\alpha = .903$), analytical writing skills ($\alpha = .919$), reflective and integrative learning ($\alpha = .922$), and higher-order learning ($\alpha = .804$). Establishing that our subscale measures are reliable allows us to further assess the results of our model. In order to achieve model fit, we scaled our model so that each latent variable has a mean value of zero with a variance of one.

Model fit was evaluated using several measures of fit statistics and was found to have sufficient goodness-of-fit to the data. Firstly, the $\chi_2 (139, N= 7970) = 3961.23$, $p < .05$, is statistically significant and doesn't provide evidence of good model fit; this is likely due to the bias against the large sample size. Alternatively, the CFI (.994) and the TLI (.993) are both excellent and well above the cutoff values of .95 (Hu & Bentler, 1999). Moreover, the RMSEA (.059) is acceptable because it is below the threshold of .08 (Hu & Bentler, 1999). In summary, the fit measures provide sufficient evidence that the proposed model has a good fit. The fitted model explained 43.2% of the variance in reflective & integrative learning and 50.6% of the variance in higher-order learning.

Findings and Discussion

This paper sought to understand how the emphasis of transferable skills relates to deep approaches to student learning (DAL). Based on our interpretation of the Briggs 3P model, we were able to do so. The model parameter estimates results can be found in Appendix E. Our results reinforce the findings from Briggs (2003) by looking specifically at transferable skills. That is, we have shown that the intentional development of transferable skills has a strong, positive relationship with the emphasis on deep approaches to learning.

Both subscales related to transferable skills-analytical writing skills and problem-solving skills-had a statistically significant relationship with the deep approaches to learning scales. The findings contribute to the existing literature by also providing empirical evidence about the extent of these relationships. The emphasis of problem-solving skills relates strongly with reflective & integrative learning ($\beta = .571$, $p < .05$) and higher-order learning ($\beta = .654$, $p < .05$). To a similar extent, analytical writing skills also has a strong relationship with reflective & integrative learning ($\beta = .387$, $p < .05$) and higher-order learning ($\beta = .462$, $p < .05$). Appendix F displays these key parameter estimates as they are situated in the structural model.

The findings connect the needs of various stakeholders and have meaningful implications for pedagogical considerations. Employers need a workforce with transferable skills, and faculty members want to create a classroom environment that is educationally effective and enriching for students. Our study provides an empirical link between the emphasis of transferable skills and deep approaches to learning that applies to any four-year institution. Further, faculty development staff can share our results with instructors to develop a more efficient and effective curriculum. This information could also be useful for faculty development in a variety of ways

depending on the discipline. For instance, faculty members in the STEM disciplines may be surprised to learn that teaching problem-solving skills is highly related to analytical writing skills. Whereas, other disciplines may already value the importance of analytical writing skills but have not considered its influence on other approaches to student learning.

Collaboration with faculty members is just the first step. Subsequently, faculty members must also help students understand the importance of transferable skills. If faculty members are willing to share their perspective with students, then students may be more intentional about gaining transferable skills. As a result, it could lead to better student outcomes and a workforce that meets the needs of employers. In summary, a collaboration that underscores the importance of transferable skills and emphasizing the need to teach these skills in the classroom can provide incredible possibilities to serve students better and advance the public good.

Limitations and Future Study

There are several limitations to be mindful of with this study. First, the findings should not be generalized to represent all institutions in the United States because the data only represents faculty members within specific departments at 72 baccalaureate-degree granting institutions. There may also be non-response bias in the data because of the opt-in nature of the survey administration. Thus, faculty members who voluntarily completed the FSSE may be more thoughtful about their teaching practices, which could skew the results. Aside from the sampling methodology and participants, future research would benefit from providing evidence of the other aspects of Biggs 3P model. In particular, our study did not introduce student factors or student outcomes; both are key components in teaching and learning (Biggs, 2003). Despite the limitations, we feel that our results provide valuable insight into transferable skills and deep approaches to learning that future studies can build upon.

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Appendix A

Transferable Skills Questions

During the current school year, whether course-related or not, to what extent have you encouraged students you teach or advise to do the following? *Response options: Very much, Quite a bit, Some, Very little*	
fTRN01d	Discuss the ethical consequences of a course of action
fTRN01e	Creatively think about new ideas or about ways to improve things
fTRN02f	Critically evaluate multiple solutions to a problem
fTRN02g	Discuss complex problems with others to develop a better solution
During the current school year, whether course-related or not, about how often have students you teach or advise written something (paper, report, article, blog, etc.) that: *Response options: Very often, Often, Sometimes, Never*	
fTRN02a	Used information from a variety of sources (books, journals, internet, databases, etc.)
fTRN02b	Assessed the conclusions of a published work
fTRN02c	Included ideas from more than one academic discipline
fTRN02d	Presented multiple viewpoints or perspectives

Reflective & Integrative and Higher-Order Learning Questions

Please answer the following questions based on one particular undergraduate course section you are teaching or have taught during the current school year. In your selected course section, how important is it to you that the typical student do the following? *Response options: 4=Very Important, 3=Important, 2=Somewhat, 1=Not important*	
fRIintegrate	Combine ideas from different courses when completing assignments
fRIsocietal	Connect their learning to societal problems or issues
fRIdiverse	Include diverse perspectives (political, religious, racial/ethnic, gender, etc.) in course discussions or assignments
fRIownview	Examine the strengths and weaknesses of their own views on a topic or issue
fRIperspect	Try to better understand someone else's views by imagining how an issue looks from their perspective
fRInewview	Learn something that changes the way they understand an issue or concept
fRIconnect	Connect ideas from your course to their prior experiences and knowledge
fHOapply	Applying facts, theories, or methods to practical problems or new situations
fHOanalyze	Analyzing an idea, experience, or line of reasoning in depth by examining its parts
fHOevaluate	Evaluating a point of view, decision, or information source
fHOform	Forming a new idea or understanding from various pieces of information

Appendix B

Table 1

Descriptive Statistics

	N	Range	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
fRIintegrate	9020	3	1	4	3.11	0.857	-0.645	0.026	-0.379	0.052
fRIsocietal	8972	3	1	4	3.12	0.952	-0.781	0.026	-0.442	0.052
fRIdiverse	8999	3	1	4	2.93	1.075	-0.575	0.026	-0.978	0.052
fRIownview	9006	3	1	4	3.26	0.903	-1.042	0.026	0.160	0.052
fRIperspect	8974	3	1	4	3.17	0.979	-0.929	0.026	-0.265	0.052
fRInewview	8969	3	1	4	3.47	0.724	-1.290	0.026	1.230	0.052
fRIconnect	8974	3	1	4	3.58	0.637	-1.454	0.026	1.705	0.052
fHOapply	8973	3	1	4	3.27	0.800	-0.879	0.026	0.101	0.052
fHOanalyze	8978	3	1	4	3.21	0.848	-0.819	0.026	-0.138	0.052
fHOevaluate	8967	3	1	4	2.95	0.973	-0.539	0.026	-0.760	0.052
fHOform	8939	3	1	4	3.15	0.855	-0.706	0.026	-0.317	0.052
fTRN01a	9605	3	1	4	2.48	1.132	0.060	0.025	-1.389	0.050
fTRN01b	9529	3	1	4	2.20	1.105	0.409	0.025	-1.181	0.050
fTRN01c	9521	3	1	4	2.34	1.072	0.208	0.025	-1.210	0.050
fTRN01d	9546	3	1	4	2.63	1.055	-0.106	0.025	-1.213	0.050
fTRN01e	9565	3	1	4	3.07	0.939	-0.674	0.025	-0.553	0.050
fTRN01f	9551	3	1	4	3.06	0.928	-0.653	0.025	-0.545	0.050
fTRN01g	9494	3	1	4	2.88	0.997	-0.413	0.025	-0.954	0.050
fTRN02a	9531	3	1	4	3.09	0.974	-0.640	0.025	-0.801	0.050
fTRN02b	9497	3	1	4	2.64	1.069	-0.071	0.025	-1.272	0.050
fTRN02c	9502	3	1	4	2.70	0.991	-0.098	0.025	-1.101	0.050
fTRN02d	9493	3	1	4	2.79	0.991	-0.229	0.025	-1.076	0.050

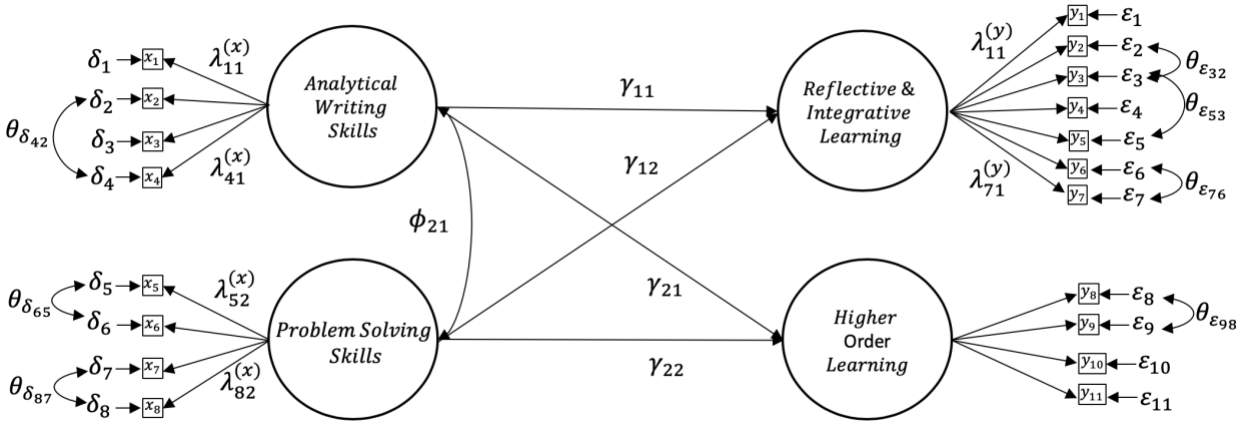
Appendix C

Table 2

Covariance Matrix

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
fRIintegrate	0.734	0.339	0.329	0.296	0.302	0.193	0.223	0.162	0.205	0.234	0.215	0.157	0.199	0.204	0.230	0.244	0.227	0.263	0.183	0.154	0.231	0.195
fRIsocietal	0.339	0.906	0.753	0.538	0.611	0.341	0.275	0.079	0.209	0.432	0.279	0.485	0.240	0.376	0.420	0.330	0.243	0.318	0.299	0.277	0.325	0.373
fRIdiverse	0.329	0.753	1.156	0.664	0.804	0.387	0.281	0.006	0.220	0.523	0.342	0.600	0.300	0.497	0.496	0.375	0.263	0.338	0.367	0.328	0.396	0.481
fRIownview	0.296	0.538	0.664	0.815	0.690	0.365	0.270	0.052	0.257	0.462	0.330	0.437	0.223	0.344	0.385	0.323	0.269	0.306	0.288	0.289	0.298	0.380
fRIperspect	0.302	0.611	0.804	0.690	0.959	0.402	0.295	0.030	0.246	0.516	0.349	0.503	0.257	0.415	0.440	0.358	0.271	0.323	0.321	0.296	0.333	0.439
fRInewview	0.193	0.341	0.387	0.365	0.402	0.524	0.262	0.065	0.177	0.269	0.240	0.284	0.150	0.225	0.243	0.235	0.200	0.218	0.169	0.173	0.185	0.231
fRIconnect	0.223	0.275	0.281	0.270	0.295	0.262	0.406	0.080	0.140	0.198	0.190	0.186	0.125	0.170	0.190	0.199	0.170	0.190	0.136	0.121	0.148	0.170
fHOapply	0.162	0.079	0.006	0.052	0.030	0.065	0.080	0.640	0.277	0.133	0.162	0.014	0.063	0.087	0.101	0.154	0.208	0.201	0.062	0.059	0.089	0.071
fHOanalyze	0.205	0.209	0.220	0.257	0.246	0.177	0.140	0.277	0.719	0.456	0.379	0.233	0.143	0.198	0.239	0.268	0.294	0.317	0.211	0.249	0.253	0.288
fHOevaluate	0.234	0.432	0.523	0.462	0.516	0.269	0.198	0.133	0.456	0.947	0.516	0.473	0.250	0.358	0.428	0.362	0.325	0.376	0.383	0.402	0.389	0.486
fHOform	0.215	0.279	0.342	0.330	0.349	0.240	0.190	0.162	0.379	0.516	0.730	0.327	0.197	0.283	0.316	0.342	0.316	0.351	0.261	0.276	0.304	0.346
fTRN01a	0.157	0.485	0.600	0.437	0.503	0.284	0.186	0.014	0.233	0.473	0.327	1.282	0.469	0.601	0.688	0.467	0.387	0.467	0.430	0.472	0.472	0.561
fTRN01b	0.199	0.240	0.300	0.223	0.257	0.150	0.125	0.063	0.143	0.250	0.197	0.469	1.221	0.572	0.430	0.364	0.316	0.404	0.354	0.337	0.352	0.345
fTRN01c	0.204	0.376	0.497	0.344	0.415	0.225	0.170	0.087	0.198	0.358	0.283	0.601	0.572	1.149	0.580	0.458	0.393	0.501	0.350	0.341	0.415	0.470
fTRN01d	0.230	0.420	0.496	0.385	0.440	0.243	0.190	0.101	0.239	0.428	0.316	0.688	0.430	0.580	1.114	0.556	0.477	0.551	0.395	0.405	0.430	0.488
fTRN01e	0.244	0.330	0.375	0.323	0.358	0.235	0.199	0.154	0.268	0.362	0.342	0.467	0.364	0.458	0.556	0.881	0.627	0.635	0.328	0.315	0.377	0.417
fTRN01f	0.227	0.243	0.263	0.269	0.271	0.200	0.170	0.208	0.294	0.325	0.316	0.387	0.316	0.393	0.477	0.627	0.861	0.704	0.291	0.305	0.343	0.388
fTRN01g	0.263	0.318	0.338	0.306	0.323	0.218	0.190	0.201	0.317	0.376	0.351	0.467	0.404	0.501	0.551	0.635	0.704	0.995	0.343	0.370	0.420	0.463
fTRN02a	0.183	0.299	0.367	0.288	0.321	0.169	0.136	0.062	0.211	0.383	0.261	0.430	0.354	0.350	0.395	0.328	0.291	0.343	0.949	0.701	0.607	0.619
fTRN02b	0.154	0.277	0.328	0.289	0.296	0.173	0.121	0.059	0.249	0.402	0.276	0.472	0.337	0.341	0.405	0.315	0.305	0.370	0.701	1.143	0.658	0.671
fTRN02c	0.231	0.325	0.396	0.298	0.333	0.185	0.148	0.089	0.253	0.389	0.304	0.472	0.352	0.415	0.430	0.377	0.343	0.420	0.607	0.658	0.981	0.728
fTRN02d	0.195	0.373	0.481	0.380	0.439	0.231	0.170	0.071	0.288	0.486	0.346	0.561	0.345	0.470	0.488	0.417	0.388	0.463	0.619	0.671	0.728	0.983

Appendix D



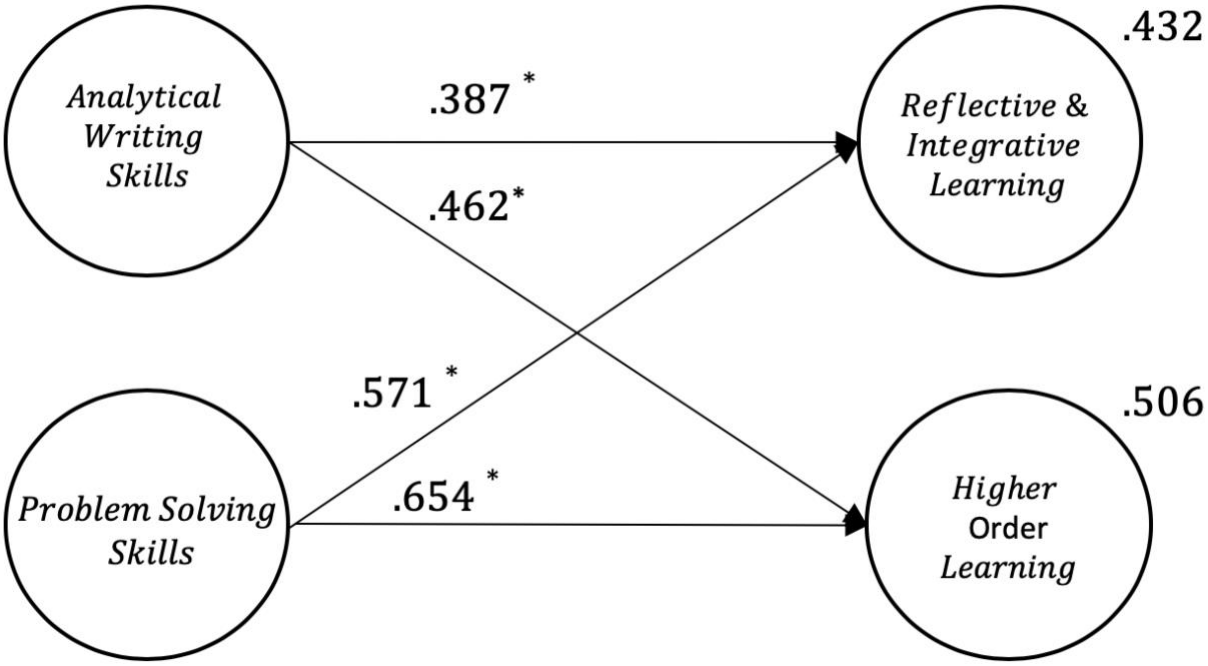
Notes: Latent Variable Structural Model of transferable skills and deep approaches to learning

Appendix E

Table 3
Parameter Estimates

Parameter	Estimate	Standard Error	p-value
Measurement Model Estimates			
PS =~ fTRN01d	0.792	0.007	0
PS =~ fTRN01e	0.897	0.005	0
PS =~ fTRN01f	0.821	0.006	0
PS =~ fTRN01g	0.814	0.007	0
AWS =~ fTRN02a	0.788	0.006	0
AWS =~ fTRN02b	0.742	0.007	0
AWS =~ fTRN02c	0.873	0.004	0
AWS =~ fTRN02d	0.951	0.004	0
RI =~ fRIintegrate	0.437	0.008	0
RI =~ fRIsocietal	0.612	0.007	0
RI =~ fRIdiverse	0.636	0.007	0
RI =~ fRIownview	0.69	0.007	0
RI =~ fRIperspect	0.694	0.007	0
RI =~ fRInewview	0.564	0.007	0
RI =~ fRIconnect	0.527	0.008	0
HO =~ fHOapply	0.224	0.009	0
HO =~ fHOanalyze	0.491	0.007	0
HO =~ fHOevaluate	0.638	0.009	0
HO =~ fHOform	0.576	0.008	0
fTRN01e ~~ fTRN01g	0.029	0.007	0
fTRN01f ~~ fTRN01g	0.166	0.008	0
fTRN02a ~~ fTRN02b	0.188	0.008	0
fRIsocietal ~~ fRIdiverse	0.14	0.006	0
fRInewview ~~ fRIconnect	0.18	0.009	0
fRIdiverse ~~ fRIperspect	0.077	0.006	0
fHOapply ~~ fHOanalyze	0.291	0.01	0
Structural Model Estimates			
RI ~ PS	0.571	0.022	0
RI ~ AWS	0.387	0.021	0
HO ~ PS	0.654	0.025	0
HO ~ AWS	0.462	0.023	0
PS ~~ AWS	0.639	0.009	0
RI ~~ HO	0.416	0.014	0
PS ~~ PS	1	0	NA
AWS ~~ AWS	1	0	NA
RI ~~ RI	1	0	NA
HO ~~ HO	1	0	NA

Appendix F



Notes: Structural model of relationships among transferable skills and deep approaches to learning. Significant paths at p< .05 are indicated with an asterisk (*). Coefficients of determination (R_2) appear at the corner of respective endogenous variables.