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New Factors of Engagement

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Abstract

In the Netherlands, research on student success has been highly influenced by Tinto's integration theory. As part of my broader PhD research, I investigate the possible influence of the use of social media by first year students in higher education on student success. In previous studies I measured the best predictive variables of Tinto's theory, derived from various studies, and conducted factor analysis on them to establish one latent variable. In this paper I focus on the role of the use of social media, in particular Facebook, to eventually adjust the model of Tinto for a better fit for students in contemporary society and the developed world. The use of Facebook is measured by purpose (information, education, social and leisure) and by the use of different pages amongst students. In line with Tinto's theory the different integration or engagement components are sought. Principal component-analysis is conducted to explore these components between the purposes of using Facebook and different pages. Internal consistency is sought and the reliability is tested by Cronbach's alpha and Guttman's lambda-2. Ultimately this paper will provide insight into what kind of influences, the use social media can have upon student success.

Key Words: Social Media, Student Success, Higher Education, Integration

Introduction

The success of students in higher education is the main subject of Tinto's (1975, 1993) integration theory, which he coined some forty years ago. The theory basically states that the more a student feels at home at the institute, the better the success or the less change of attrition. He distinguishes social and academic integration, which was initially not based on survey data. However, many researchers were interested in the theory and tried to empirically test it. Some researchers, after having tested the theory, suggested improvements or an alternative theory. Pasceralla (Pascarella, Duby, & Iverson, 1983) showed that, independent of the social or academic integration, the various background of students had a direct effect on students success. Tinto himself pointed in later work (Tinto, 1993) to external forces, as have other studies (Berger, 1999; Cabrera, 1992). A study by Beekhoven (2002) pointed out that these external forces especially have influence on non-residential and urban colleges. This eventually led her to leave the dichotomy of social and academic integration behind and included an element from the rational choice theory by Coleman (Coleman, 1990) 'expected duration'. In her conclusion see found that the latter was a better predictor of student success that integration and found the data from the integration variables too large.

Despite the difficulties found in studies using the integration theory, elements of the theory are still being used in different studies and for different purposes. 'The Dutch government [also] annually monitors rational decisions that can influence students' success, such as 'time spent on study' and 'time spent on work'. Like the government, most institutions, after each semester or trimester, measure these factors along with the degree of satisfaction concerning the courses, teachers and institute and the various background variables which where proven to be of influence in previous studies (Braxton, Milem, & Sullivan, 2000; CBS, 2009; Meeuwisse, Severiens, & Born, 2010; Pascarella et al., 1983; Spady, 1971; Tinto, 1975, 1993; Vogels, 2003; Wesseling, 2011).

Let us now step back to compare the situation of the 1970/80's, when Tinto coined the theory and contemporary society. With the expanding role of the computer, Smartphones, the Internet and refining technology it is easier to share, access and store the increasing amount of information. New ways of communicating have emerged, also bringing new possibilities. The emergence of Smartphones has increased the potential and variety of ways we communicate and the accessibility of information and the way we share this. The necessity of being in the same place to interact, share information and communicate with each other no longer exists. The new media and numerous ways of communication and sharing information enables students to engage in virtual worlds, groups or communities where the students explore, in Tinto's words, integrating activities and share information for all purposes. The line between activities in and outside the school are not so strict anymore. Although Tinto's integration theory tends to reason more in line with the 'dominant discourse' (Foucault, 1979) of the '80/'90's society, wherein 'this discourse functions as "imagined geography" of education, constituting when and where researchers and teachers should expect learning "take place" (Leander, 2010, p. 329). In other words, Tinto's theory focuses more on the activities within the borders of a University or college, whereas I argue that these borders are no longer that rigid and therefore the learning and integrating activities are no longer restricted by geography, time and space. More recent studies on student success have adopted the term 'engagement' to pinpoint this difference as apposed to integration.

Students and Communication

The ways in which students communicate have also gone through some major transformations. A study conducted by the Netherlands Institute for Social Research (SCP) in 2005 already showed that 98% of all households with at least one teenager, owned a computer with access to the Internet (Duimel, 2007). These teenagers are the students currently in higher education. Consequently, they are probably well accustomed to online activities and the possibilities of the new media, especially when you take into account that the higher educated one is, the greater the chance of being an early adopter of new media (Huysmans, 2010). In a previous study I pointed out that Facebook was the most popular tool amongst the students to use to communicate and share information (Wesseling, 2012a, 2013). Furthermore, these studies showed that the students use different Facebook pages and use Facebook for different purposes.

The use of pages can be divided into the use of a) their profile page, b) a project page (6 to 8 students), c) a class page (30 students) and, d) a year page (900 students). The use of Facebook (FB) by purpose is categorized in: a) education, b) information, c) social and d) leisure. In the 2013 study I already discovered that "that students who use Facebook for educational purposes tend to use a specific page rather than share the educational information through their own page [and] students who use Facebook for information sharing do use a separate page more often than their own page for contact with other students. The data even show that the more students use their own page for communicating with other students the less they use this 'profile page' for educational purposes or information sharing. [Plus] the less they use Facebook for educational purposes the more they use it for leisure. Furthermore these correlations were stronger in the year (2011-2012) when Facebook was not a mandatory component of the curriculum" (Wesseling, 2013, p. 4067).

In this paper the specific use is examined with principal component analysis to uncover possible latent variables, which can be seen as integrating activities that could possible influence the success of a student. In this paper the following question will addressed: Can the use of Facebook be categorized by uncovering latent variables? To answer this question, I want to introduce two possible new latent variables: knowledge engagement and peer engagement.

Method

The data in this study was gathered by using self-report questionnaires. In two consecutive college years (2011-2012 and 2012-2013), all first-year students of the Amsterdam University of Applied Science at the Department of Media, Communication and Information, were given digital surveys. In both years there was a different limited enrolment, respectively 960 and 900. However due to various reasons in both years 904 students were enlisted in the beginning of the year. All were given three surveys during the college year, from September through July.

Although the surveys were part of the career-counseling program, not all students participated. This led to a diminished participation in the course of the year. When taken into account the number of dropouts (voluntarily or mandatory due to insufficient study results) the percentages of participants in 2011-2012 were: 88.6% in September 2011 (801 out of 904 students), 76.5% in January 2012 (599 out of 783 students) and 55.1% in June 2012 (415 out of 744 students). In 2012-2013 the percentages were: 80.0% in September 2012 (724 out of 904 students), 58.9% in January (428 out of 728 students) and 39.9% in April (276 out of the 692 students).

All surveys were sent via email using the students' addresses provided by the Institution. As shown above the first survey was sent in September, the second in January, only the third was distributed in different months. In 2011-2012 the survey was sent in May and a reminder was sent in June. In 2012-2013 it was sent in April with a reminder in May. The digital surveys were distributed using Google docs via the students email addresses, provided by the Institute. The data from all the surveys was downloaded using Microsoft Excel into an SPSS file. After being screened for anomalies[1], the data was analyzed using PASW (formally SPSS) Statistics 23 and SPSS AMOS 23. The internal consistency of the integration item/latent variables are measured using principal component analysis (PCA). And here the KMO, Bartlett's test of sphericity, Cronbach's alpha and Guttman's lambda are also measured (Flield, 2009).

Findings

The possible relation between the different usages of FB is explored by conducting principal component analysis (PCA). To explore the different components measured by the purpose of FB use and the use of different pages, the first principal component-analysis is conducted, including all items in 2011-2012. As shown in table 1, all items can be divided into three components.

	Component		
	1	2	3
Facebook own page	-.837	.189	.170
Facebook project page	.736	-.011	-.289
Facebook information	.612	.309	.359
Facebook education	.604	.458	.238
Facebook class page	.586	.007	-.251
Facebook social	-.107	.765	-.288
Facebook leisure	-.323	.674	-.014
Facebook year page	.128	-.028	.802

Table 1. New Factors of Engagement – all items 2011
(Component Matrix[a])
Extraction Method: Principal Component Analysis.
a. 3 components extracted.

The first component includes FB use for education and information together with the use of a class, project and own page. The second includes social, leisure and also education. The third exist only of the year page. In the Figure 7 the components are displayed graphically in a plot, which shows that the use of their own FB page and year page stand out of the rest. The anti-image correlation matrix (see Appendix I) shows that the means of sample adequacy (MSA) for the individual variables (or items) are not all above the bare minimum of .5, which indicate that these items do not contribute to the strength. To inspect the relations between the items more closely, the next two paragraphs show the breakdown into the two, above mentioned, latent variables.

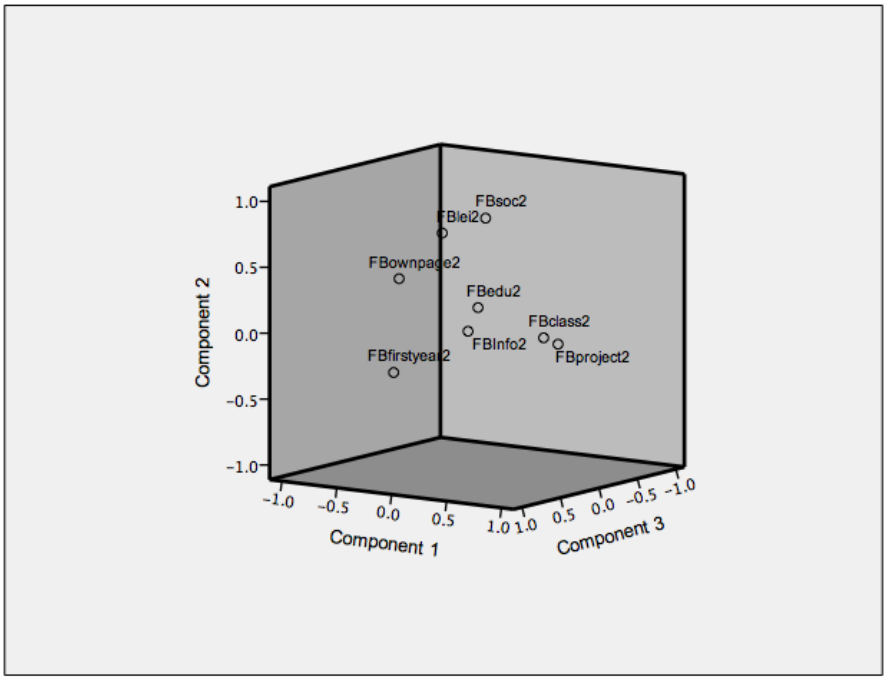

Figure 7. Component Plot in Rotated Space 2011-2012

Principal Component Analysis of Knowledge Engagement

After having established that there are three components involved, the next step is to search for a better fit of the items for each component. Another PCA of the items in the first component was conducted with orthogonal rotation (varimax). In table 2 the rotated

	Component	
	1	2
Facebook own page	-.926	
Facebook project page	.809	
Facebook class page	.601	
Facebook information		.853
Facebook education		.845

Table 2. knowledge engagement – all items 2011
(Rotated Component Matrix[a])
Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 3 iterations.

component matrix shows that if the items, which had their highest load in the first component, are separated from the rest. They also consist of two components. However, the value of the use of the FB page is negative. When excluding this item in another PCA the result, as shown in table 3, is that the items seem to measure the same component. In appendix II the tables of the Kaiser-Meyer-Olkin measure shows a medium sample adequacy for the analysis, KMO = .65 and the anti-image matrix shows that the individual values are >.61. The Bartlett's test of sphericity $X^2(10) = 245.348$, $p < .001$, indicates that correlations between the item are sufficiently large.

	Component 1
Facebook education	.779
Facebook information	.776
Facebook project page	.595
Facebook class page	.544

Table 3. Knowledge Engagement – 4 items, 2011 (Component Matrix[a])
Extraction Method: Principal Component Analysis.
a. 1 components extracted.

Table 4, 5 and 6 show, respectively, the reliability measured with Cronbach's alpha ($\alpha = .60$), the reliability measures with Guttman's lambda-2 ($\lambda_2 = .65$) and the diminishment

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.602	.607	4

Table 4. Knowledge Engagement – 4 items, 2011 (Reliability Statistics)

Lambda	1	.451
	2	.647
	3	.602
	4	.435
	5	.680
	6	.584
N of Items		4

Table 5. Knowledge Engagement – 4 items, 2011 (Reliability Statistics)

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Facebook project page	2.26	2.954	.319	.107	.582
Facebook class page	2.40	3.101	.286	.085	.602
Facebook information	1.41	1.509	.508	.278	.443
Facebook education	1.87	1.932	.521	.282	.408

Table 6. Knowledge Engagement – 4 items, 2011 (Item-Total Statistics)

of reliability if an item is deleted. One item could be deleted without lowering Cronbach's alpha: the use of a class page. The table shows that if the alpha is deleted, Cronbach's alpha would stay the same ($\alpha = .60$). But when deleting the item and a new PCA is conducted, the KMO measure of sampling adequacy decreases to .59 and Guttman's lambda-2 to $\lambda_2 = .60$. Therefor, given the data in 2011-2012, *knowledge engagement* is composed by the variables: use of a project and a class page and the use of FB for education and information.

Knowledge Engagement in 2012-2013

The same steps were conducted for the 2012-2013 data. Table 7 shows that in this year all items can be divided into four components. The first component includes FB use

	Component			
	1	2	3	4
Facebook social	.710			
Facebook education	.685			
Facebook information	.666			
Facebook project page		-.809		
Facebook year page		.787		
Facebook class page			-.778	
Facebook own page			.731	
Facebook leisure				.931

Table. 7. Knowledge Engagement – all items, 2012
(Rotated Component Matrix[a])
Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 5 iterations.

for social, education and information. The second component consists of the use of a project and a year page. However, the influence of the use of a project page is reverse of the use of a year page. The third component consists of the use of their own page and class page. The latter is also negative. At last, the use of FB for leisure is responsible for the fourth component. When several PCA's are conducted by eliminating items one by one and using different combinations of items, the best fit between the several items is found between FB use for education, information and social purposes. When excluding these items in in a PCA, the result, shown in table 8, is that these items together explain 48.7% of the variance. In table 9 and 10, respectively the Cronbach's alpha ($\alpha = .47$) and the values of Cronbach's.

	Initial Eigenvalues			Extraction Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1.461	48.714	48.714	1.461	48.714	48.714
2	.829	27.619	76.332			
3	.710	23.668	100.000			

Table 8. Knowledge engagement – 3 items, 2012
(Total Variance Explained)
Extraction Method: Principal Component Analysis.

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.469	.472	3

Table 9. Knowledge Engagement – 3 items, 2012
(Reliability Statistics)

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Facebook information	1.92	1.949	.290	.086	.372
Facebook education	2.91	2.343	.265	.072	.422
Facebook social	2.63	1.504	.337	.114	.290

Table 10. Knowledge Engagement – 3 items, 2012
(Item-Total Statistics)

alpha if an item was deleted. Deleting any of the items would not lead to an increase of the alpha. The Guttman's lambda-2 is slightly higher ($\lambda_2 = .48$) as shown in table 11, however still small. That's why the KMO test is also conducted to measure the sample

Lambda	1	.313
	2	.477
	3	.469
	4	.499
	5	.491
	6	.378
N of Items		3

Table 11. Knowledge Engagement – 3 items, 2012
(Reliability Statistics)

adequacy (see table 12). According to Kaiser (1974), a KMO of .5 is the minimum and in this case it's just above with a score of .59. The anti-image matrix (table 13) shows that the individual values are >.57 which is sufficient. Furthermore, the Bartlett's test of sphericity $X^2(3) = 64.398$, $p < .001$, indicates that correlations between the items are significant.

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.589
Bartlett's Test of Sphericity	Approx. Chi-Square	64.398
	df	3
	Sig.	.000

Table 12. Knowledge Engagement – 3 items, 2012
(KMO and Bartlett's Test)

		Facebook social	Facebook education	Facebook information
Anti-image Covariance	Facebook social	.886	-.189	-.216
	Facebook education	-.189	.928	-.105
	Facebook information	-.216	-.105	.914
Anti-image Correlation	Facebook social	.569[a]	-.208	-.240
	Facebook education	-.208	.614[a]	-.115
	Facebook information	-.240	-.115	.595[a]

Table 13. Knowlegde Engagement – 3 items, 2012
(Anti-image Matrices)

a. Measures of Sampling Adequacy(MSA)

Principal Component Analysis of Peer Engagement

As shown above by using PCA, all items involving FB use by purpose and pages in 2011-2012, fell out into three components. After establishing that the four items (use of a FB project and a FB class page and the use of FB for education and information), can be seen as a latent variable, which I named *knowledge engagement*. In this paragraph, the other items are explored also using PCA to uncover a possible other latent variable, which I coined peer engagement.

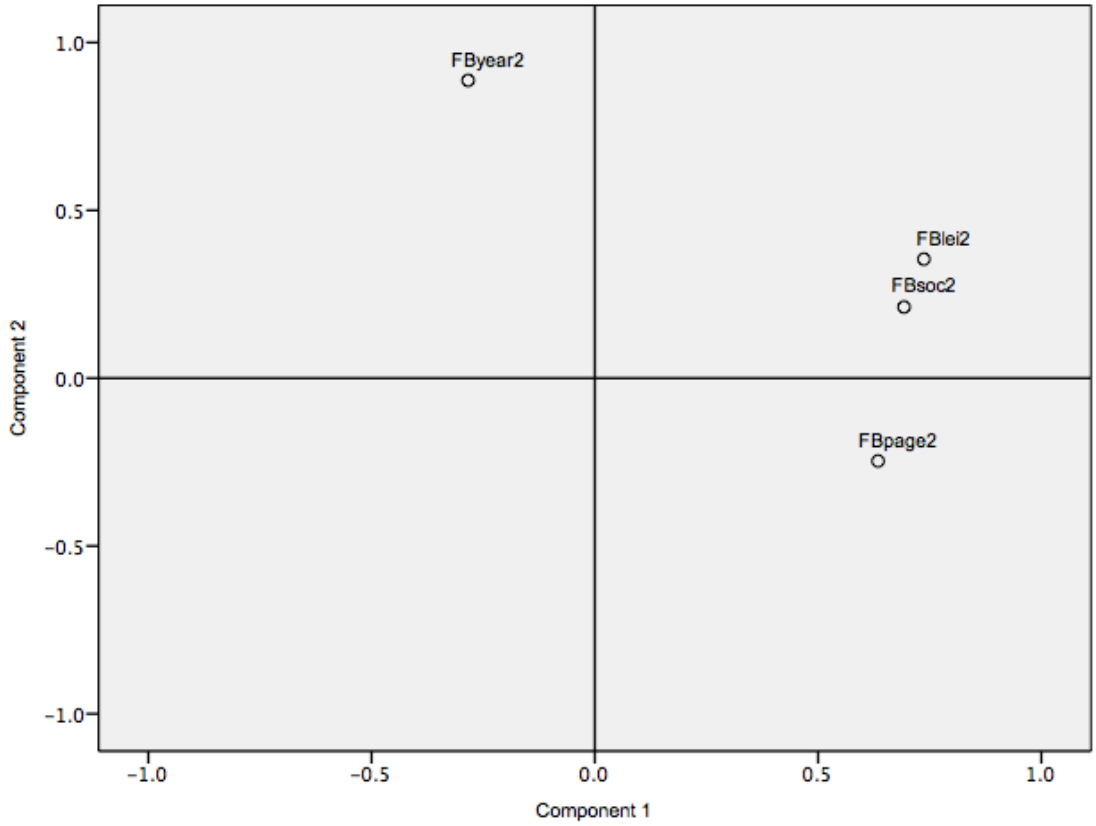

Figure 2. Component plot - 4 items, 2011-2012.

Figure 2 and table 14 show that the remaining four items, as expected, fall into two

	Component	
	1	2
Facebook own page	.634	-.247
Facebook year page	-.284	.887
Facebook social	.693	.212
Facebook leisure	.737	.355

Table 14. Peer Engagement – 4 items, 2011
(Component Matrix[a])
Extraction Method: Principal Component Analysis.
a. 2 components extracted.

components. The use of a year page still stands on its own and has an opposite effect compared to the rest of the items. When another PCA is conducted without the use of a FB the year page, table 15 shows that the three remaining items consists of one component and explain 49.2% of the variance (table 16).
Furthermore, Table 17 and 18 show, respectively Cronbach's alpha (α = .38) and Guttmann's lamba-2 (λ_2 = .39). The latter is the reason why FB social isn't deleted as

	Component 1
Facebook leisure	.777
Facebook social	.706
Facebook own page	.612

Table 15. Peer Engagement – 3 items, 2011 (Component Matrix[a])
Extraction Method: Principal Component Analysis.
a. 1 components extracted.

	Initial Eigenvalues			Extraction Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1.477	49.225	49.225	1.477	49.225	49.225
2	.859	28.637	77.862			
3	.664	22.138	100.000			

Table 16. Peer Engagement – 3 items, 2011 (Total Variance Explained)
Extraction Method: Principal Component Analysis.

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.375	.480	3

Table 17. Peer Engagement – 3 items, 2011 (Reliability Statistics)

suggested in table 19. Although these values are not that high, the KMO test reveals (table 20) that the three items do pass the bar minimum of .5 (.57) and the Bartlett's test of sphericity $X^2(3) = 83.949$, $p < .001$, indicates that the correlations between the items are significant. Furthermore, the anti images matrix (table 21) shows the individual values are >.55 which is sufficient.

Lambda	1	.250
	2	.386
	3	.375
	4	.352
	5	.401
	6	.327
N of Items		3

Table 18. Peer Engagement – 3 items, 2011 (Reliability Statistics)

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Facebook own page	1.55	1.716	.202	.064	.341
Facebook social	.66	.518	.284	.106	.383
Facebook leisure	1.78	1.665	.367	.139	.198

Table 19. Peer Engagement – 3 items, 2011
(Item-Total Statistics)

According to the PCA conducted on the remaining four items, another latent variable is discovered consisting of the use of their own FB page and FB use for social and leisure. These items together form the variable peer engagement in 2011.

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.573
Bartlett's Test of Sphericity	Approx. Chi-Square	83.949
	df	3
	Sig.	.000

Table 20. Peer Engagement – 3 items, 2011
(KMO and Bartlett's Test)

		Facebook own page	Facebook social	Facebook leisure
Anti-image Covariance	Facebook own page	.936	-.071	-.186
	Facebook social	-.071	.894	-.257
	Facebook leisure	-.186	-.257	.861
Anti-image Correlation	Facebook own page	.621[a]	-.078	-.207
	Facebook social	-.078	.571[a]	-.292
	Facebook leisure	-.207	-.292	.552[a]

Table 21. Peer Engagement – 3 items, 2011 Anti-image Matrices
a. Measures of Sampling Adequacy(MSA)

Peer Engagement in 2012-2013

As seen in above, items in 2012-2013 for the latent variable *knowledge engagement* differ from the previous year. Therefore, this paragraph will investigate the remaining items for 2012-2013 and possibly uncover other relations. In 2012-2013 all items together consisted of four components (see table 7). Several PCA's were conducted with all possible combinations of the items. The only combination, which consisted of one component, was found for the same combination of items as in 2011-2012: FB use of their own page and FB use for social and leisure. Although the values are very different as opposed to 2011-2012, the value from the KMO test (table 22) shows a medium sample adequacy and the Bartlett's test of sphericity $X^2(3) = 17.395$, $p < .005$ (not $p < .001$ as in 2011-2012). These items explain 40.4 % (tables 23) of the total variance. However, the Cronbach's alpha and Gutmann's lambda-2 are rather small, respectively .105 and .144 (table 24 and 25). Furthermore, the value of FB own page is negative which could indicate that there would be a better fit without this item (see table 26).

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.513
Bartlett's Test of Sphericity	Approx. Chi-Square	17.395
	df	3
	Sig.	.001

Table 22. Peer Engagement – 3 items, 2012
(KMO and Bartlett's Test)

	Initial Eigenvalues			Extraction Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1.212	40.406	40.406	1.212	40.406	40.406
2	.978	32.608	73.014			
3	.810	26.986	100.000			

Table 23. Peer Engagement – 3 items, 2012
(Total Variance Explained)
Extraction Method: Principal Component Analysis.

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.105	.076	3

Table 24. PEER ENGAGEMENT – 3 items, 2012
(Reliability Statistics)

Lambda	1	.070
	2	.144
	3	.105
	4	-.029
	5	.155
	6	.106
N of Items		3

Table 25. PEER ENGAGEMENT – 3 items, 2012
(Reliability Statistics)

Another PCA was conducted for the remaining two items and table 27 shows that the two items explain 59.3% of the total variance. Which is almost 20% more than the explained variance by, the above mentioned, three items. The KMO test (table 28) has exactly the value of .5 and the Bartletts's test shows the correlation is significant ($X^2(1)= 14.961, p < .001$).

	Component 1
Facebook own page	-.304
Facebook social	.621
Facebook leisure	.589

Table 26. PEER ENGAGEMENT – 3 items, 2012
(Component Score Coefficient Matrix)
Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

	Initial Eigenvalues			Extraction Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1.186	59.283	59.283	1.186	59.283	59.283
2	.814	40.717	100.000			

Table 27. Peer Engagement – 2 items, 2012 (Total Variance Explained)
Extraction Method: Principal Component Analysis.

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.500
Bartlett's Test of Sphericity	Approx. Chi-Square	14.961
	df	1
	Sig.	.000

Table 28. PEER ENGAGEMENT – 2 items, 2012
(KMO and Bartlett's Test)

Cronbach's alpha and Gutmann's lambda-2 reliability tests show a very weak correlation between the two items. They both have a value of .168 (table 29 and 30), which points to unreliability. However, in case of determining reliability between two items, a better test is the Spearman-Brown (Eisinga, 2013). Table 31 shows that the value is considerably higher (.313), however still questionable.

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.168	.313	2

Table 29. PEER ENGAGEMENT – 2 items, 2012
(Reliability Statistics)

Lambda	1	.084
	2	.168
	3	.168
	4	.168
	5	.168
	6	.116
N of Items		2

Table 30. Peer Engagement – 2 items, 2012
(Reliability Statistics)

Cronbach's Alpha	Part 1	Value	1.000
		N of Items	1[a]
	Part 2	Value	1.000
		N of Items	1[b]
	Total N of Items		2
Correlation Between Forms			.186
Spearman-Brown	Equal Length		.313
Coefficient	Unequal Length		.313
Guttman Split-Half Coefficient			.168

Table 31. Peer Engagement – 2 items, 2012
(Reliability Statistics)

a. The items are: Facebook leisure 2

b. The items are: Facebook social 2

Conclusion

The two years differ quite a lot when searching for latent variables for FB use. The combination of items for the latent variables *knowledge engagement* and *peer engagement* found in 2012-2013 did not give the same result as in 2011-2012.

If you look at the different items that seem to form the latent variables in 2011-2012, they appear to consist of items, which are more logical to belong to the same latent variable. *Knowledge engagement* is composed by the use of a project and a class page and the use of FB for education and information. All of this points towards the direction of use for education. *Peer engagement* is composed by use of their own FB page and FB use for social and leisure, which points more in the direction of the use for social purposes. In 2012-2013 this distinction is not so clear because the use of FB for information, education and social seem to fall into one latent variable and the latter also correlates with leisure. This overlay of FB for social purposes might also be the cause of a lower score of the reliability tests.

However, in 2012-2013, the membership of a FB class page was mandatory, which was not the case in 2011-2012. This could have led to a different use of FB by the students. As mentioned above, in a previous study (Wesseling, 2013) I already showed that the students use FB more for educational purposes if the teachers do not dictate to join a FB class page. The principal component analysis seems to back this by clearly distinguishing the knowledge engagement and peer engagement in 2011-2012. In the succeeding year the social purpose takes the overhand and burrs this distinction.

References

Beekhoven, S. (2002). *A fair chance of succeeding. Study careers in Dutch higher education.* (PhD), Universiteit van Amsterdam, Amsterdam.

Berger, J., & Millem, J. F. (1999). The role of student involvement and perceptions of integration in a causal model of student persistence. *Research in Higher Education, 40*(6), 641-664.

Braxton, J. M., Milem, J. F., & Sullivan, A. S. (2000). The Influence of Active Learning on the College Student Departure Process: Toward a Revision of Tinto's Theory. *The Journal of Higher Education, 71*(5), 569-590.

Cabrera, A. F., Castaneda, M.B., Nora, A., & Hengstler, D. (1992). The convergence between two theories of college persistence. *Journal of Higher Education, 64*(2), 143-437.

CBS. (2009). *Jaarboek onderwijs in cijfers 2009*. Retrieved from Voorburg/Heerlen:

Coleman, J. (1990). *Foundations of Social Theory*. Cambridge: Belknap Press of Harvard University Press.

Duimel, M., & De Haan, J. (2007). *Nieuwe links in het gezin. De digitale leefwereld van tieners en de rol van hun ouders*. Den Haag: Sociaal Cultureel Planbureau.

Eisinga, R., Grotenhuis, M.T. & Pelzer, B. (2013). The reliability of a two-item scale: Pearson, Cronbach or Spearman-Brown? *Int J public Health, 58*(637). doi:10.1007/s00038-012-0416-3

Flield, A. (2009). *Discovering statistics using SPSS (and sex and drug's and rock 'n' roll)* (3rd ed.). London: SAGE Publications Ltd.

Foucault, M. (1979). *Discipline and punish: The birth of a prison*. New York: Vintage Books.

Huysmans, F., & De Haan, J. (2010). *Alle kanalen staan open. De digitalisering van mediagebruik*. Den Haag: Sociaal Cultureel Planbureau.

Kaiser, H. F. (1974). An index of factorial simplicity. *Psychometrika*(39), 31-36.

Leander, K. M., Phillips, N.C., & Headrick T. K. (2010). The Changing Social Spaces of Learning: Mapping New Mobilities. *Review of Research in Education* (34), 329-393. doi:10.3102/0091732X09358129

Meeuwisse, M., Severiens, S. E., & Born, M. P. (2010). Learning Environment, Interaction, Sense of Belonging and Study Success in Ethnically Diverse Student Groups. *Research in Higher Education, 51*(6), 528-545. doi:10.1007/s11162-010-9168-1

Pascarella, E. T., Duby, P. B., & Iverson, B. K. (1983). A Text and Reconceptualization of a Theoretical Model of College Withdrawal in a Commuter Institution Setting. *Sociology of Education, 56*(2), 88-100.

Spady, W. (1971). Dropouts from higher education: towards an empirical model. *Interchange, 2*, 36-62.

Tinto, V. (1975). Dropout from higher education. *Review of Educational Research, 45*(1), 89-125.

Tinto, V. (1993). *Leaving College: Rethinking the Causes and Cures of Student Attrition (Rev.ed)* (2 ed.). Chicago: University of Chicago Press.

Vogels, R., Bronneman-Helmers, I., & Kuiper, E. (2003). *Autochtone achterstandsleerlingen een vergeten groep*. Retrieved from Den Haag:

Wesseling, N. F. (2011, 14th-16th). *Factors that influence the success of students in higher education in a information society.* Paper presented at the International Conference of Education, Research and Innovation (ICERI2011), Madrid, Spain.

Wesseling, N. F. (2012a). *How students use Facebook.* Paper presented at the WEI International European Academic Conferennce Proceedings, Zagreb 14-17 September, Croatia.

Wesseling, N. F. (2012b). *Student engagement 2.0.* Paper presented at the 4th annual International Conference on Education and New Learning Technologies, Barcelona, 2-4 July 2012, Spain.

Wesseling, N. F. (2013). *Facebook use by students in 2011-2012 and 2012-2013 and factors of integration in higher education.* Paper presented at the 5th International Conference on Education and New Learning Technologies, Barcelona, Spain.

Wesseling, N. F. (2016, 14-16 November). *Factor analysis of engagement/satisfaction.* Paper presented at the ICERI2106, Seville, Spain.

Appendix I

NEW FACTORS OF ENGAGEMENT – all items 2011 (Anti-image Matrices)

		Facebook own page 2	Facebook project page 2	Facebook class page 2	Facebook year page 2	Facebook information 2	Facebook education 2	Facebook social 2	Facebook leisure 2
Anti-image Covariance	Facebook own page 2	.339	.269	.249	.142	-.008	-.001	-.103	-.047
	Facebook project page 2	.269	.434	.165	.129	-.045	-.077	-.112	.040
	Facebook class page 2	.249	.165	.658	.146	-.089	-.056	-.057	-.009
	Facebook year page 2	.142	.129	.146	.909	-.075	-.034	.033	-.055
	Facebook information 2	-.008	-.045	-.089	-.075	.707	-.311	.034	.033
	Facebook education 2	-.001	-.077	-.056	-.034	-.311	.692	-.085	-.021
	Facebook social 2	-.103	-.112	-.057	.033	.034	-.085	.838	-.256
	Facebook leisure 2	-.047	.040	-.009	-.055	.033	-.021	-.256	.850
Anti-image Correlation	Facebook own page 2	.518[a]	.701	.527	.256	-.016	-.001	-.193	-.087
	Facebook project page 2	.701	.501[a]	.308	.205	-.082	-.140	-.185	.065
	Facebook class page 2	.527	.308	.472[a]	.189	-.130	-.083	-.076	-.011
	Facebook year page 2	.256	.205	.189	.213[a]	-.094	-.043	.038	-.062
	Facebook information 2	-.016	-.082	-.130	-.094	.664[a]	-.445	.044	.043
	Facebook education 2	-.001	-.140	-.083	-.043	-.445	.667[a]	-.111	-.028
	Facebook social 2	-.193	-.185	-.076	.038	.044	-.111	.434[a]	-.303
	Facebook leisure 2	-.087	.065	-.011	-.062	.043	-.028	-.303	.648[a]

a. Measures of Sampling Adequacy(MSA)

Appendix II

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.650
Bartlett's Test of Sphericity	Approx. Chi-Square	245.348
	df	6
	Sig.	.000