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ORIGINAL RESEARCH ARTICLE

Analysing the impact of e-learning technology on students' engagement, attendance and performance

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In higher education, e-learning technology such as Blackboard (Bb) is widely used and has become a popular tool worldwide. It helps reduce the communication gap between students and tutors, without time and location constraints. The study of student engagement and the impact on performance is a key issue in higher educational research, so identifying how students use e-learning technology can help contribute to how to design e-learning materials that further support student engagement. This quantitative research study examined two undergraduate engineering modules. Utilising the Statistical Package for the Social Sciences, the number of clicks students made on Bb was assessed against their classroom attendance, engagement with activities and their performance in the final grade in the module assessment. The outcomes contribute to the developing literature on students' interaction with online learning, by providing an insight into the way students' use of e-learning materials influences their performance in their studies.

Keywords: Attendance; Blackboard; communication; engagement; e-learning technology; higher education; Blackboard clicks; Blackboard hits; performance

Introduction

This article presents the findings of an initial study that was undertaken to examine how the use of Blackboard (Bb) could identify the extent to which students utilised online materials in their engineering courses. The study was undertaken to explore if regular links to the online resources were related to their attendance and supported their engagement with their studies. The findings contribute to the literature on how the development of Web-based technologies can enhance students' performance in higher education.

Literature review

The development of web-based technologies

The ease of access to online materials has also become more common because of advancement in information technology via e-devices such as desktops, laptops and smartphones. Although new e-learning resources are appearing all the time in

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education, one of the most prolific virtual learning environments (VLEs) is Bb. Bb is a system that allows users to access it via a unique username and password to log into their subject modules or programme. It started as 'one of leading commercial learning management systems and then shifted to wide use as a course management system software package in educational institutions (Guo, Zhang, and Guo 2016; Zidan 2015, p. 230).

Electronic learning through the World Wide Web, or e-learning via the Internet, as it is now more commonly known, has become possible because of the advancements in communication, networking and broadcast technologies. The use of electronic materials is heavily researched from a number of different perspectives (Flavin and Quintero 2018). For example, research by Hewitt and Stubbs (2017) examined how learning technology could help address law students' anxiety about their studies and improve their self-efficacy. A study by Young and Nichols (2017) examined how academics embedded digital learning approaches into the curriculum. Throughout this extensive research, the debates surrounding the use of the Internet and related advanced technologies have acquired a number of different terms, which are frequently used interchangeably in the literature. These terms include *blended learning*, *distance education* or *distance learning*; *online environment learning*; *Web-based instruction* and more recently *VLEs* (Young and Nicols 2017). VLEs such as Bb, Canvas and WebChat (WebCT) can be available 24 h per day, all year around.

Universities may have many national and international students studying in their programmes; therefore, within this heavily competitive marketisation and internationalisation of higher education, they have to ensure that they stay up to date with the latest e-learning technologies to improve communications, as well as student engagement and performance. This technology also helps to improve student engagement in terms of the time spent on a task, quality of effort and student involvement. The challenges and benefits of e-learning have been discussed in many articles (see *inter alia* Altuna and Lareki 2015; Bouhnik and Marcus 2006; Liaw, Huang, and Chen 2007; Raab, Ellis, and Abdon 2002), but a common thread throughout the research is the importance of e-learning technologies as a support mechanism for helping students to engage in their studies. Starting with a discussion of what is meant by *engagement*, the following section highlights some of the issues surrounding the use of e-learning technologies.

What is engagement?

The generic term *engagement* employed throughout the literature on higher education depicts students' study patterns, how they use their time, resources, relationships and communications with their tutors, peers and the organisation (Kahn 2014; Trowler 2010). Theories of how best to do this, however, vary across and within disciplines. From a behavioural perspective, *engagement* is defined as the 'time and effort students devote to educationally purposeful activities' (ACER 2010), but from a psychological perspective cognition incorporates individual characteristics such as motivation, self-efficacy and expectations as part of student engagement (Jimerson, Campos, and Greif 2003). Researchers in the UK have proposed a more holistic definition: 'The conception of engagement encompasses the perceptions, expectations and experience of being a student and the construction of being a student' (Bryson, Hardy, and Hand 2009). Whichever definition is postulated, research into improving students' engagement in their studies embraces all the quality enhancement and quality assurance

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processes, ensuing in the improvement of the educational experience (UK Quality Code for Higher Education 2012).

Some studies have examined students' feelings and emotions surrounding the process of engagement. According to Harper and Quaye (2009), student engagement is more than just involvement or participation. It requires a positive frame of mind, 'mood' and 'sense making' in addition to physically active involvement in different types of activities within the academic environment. Acting without sentiment, engagement is just like participation; feeling engaged without acting is known as dissociation. Fredricks, Blumenfeld and Paris (2004) classified student engagement into three dimensions (see Table 1).

- Behavioural engagement: Students who are behaviourally engaged would typically comply with behavioural norms, such as attendance and involvement, and would demonstrate the absence of disruptive or negative behaviour.
- Emotional engagement: Students who engage emotionally would experience affective reactions such as interest, enjoyment or a sense of belonging.
- Cognitive engagement: Cognitively engaged students would be invested in their learning, would seek to go beyond the requirements and would relish challenge.

A study by Stewart, Stott and Nuttall (2011) about the relationship between student engagement in terms of attendance, online learning and performance was inconclusive, but their findings did demonstrate the importance of attendance as a predictor of performance and argue it is influenced by the study behaviour rather than time spent on accessing the resources (Bb clicks, or 'hits'), particularly online resources. They also suggested that an integrated blended learning approach could help to improve student performance.

How does technology enhance engagement?

While research into helping students engage with their studies has shown the importance of good communications, starting with clear guidance to students about what it is they will study, assessment and feedback (Higher Education Academy 2017; Kahu 2013; Thomas 2012), the complexity of this process is articulated in research findings across both the general and specialist literature on higher education (Zepke 2014). The emerging research into how students think and feel about their studies has also added to the intricacies of the debates whilst contributing to how different resources might be used in various ways to positively enhance the students' experience and performance (Hewitt and Stubbs 2017). The stronger the engagement, the better the student is seen to perform (Trowler 2010).

Table 1. Examples of positive engagement, negative engagement and non-engagement.

Types	Positive engagement	Non-engagement	Negative engagement
Behavioural	Attends lectures, participates with enthusiasm	Skips lectures without excuse	Boycotts, pickets or disrupts lectures
Emotional	Interest	Boredom	Rejection
Cognitive	Meets or exceeds assignment requirements	Assignments late, rushed or absent	Redefines parameters for assignments

The student profile in higher education has changed considerably over the past two decades, not only with the internationalisation of the curriculum (Higher Education Academy 2017) but with the attendance patterns of students. While the traditional, full-time student remains, many students now work part-time or combine distance learning with course attendance. This change in study patterns has necessitated the use of Web-based technologies.

The research study and limitations

The study concentrated on exploring the relationship that might exist between student engagement, attendance and performance. The study was limited to one undergraduate course module in a civil engineering programme, over two levels: Level 4 and Level 6. As part of their programme studies, students are normally required to search the learning and teaching materials for the coursework assignment and exam purposes. It is not possible, therefore, to argue that Bb hit rates have any impact on students' engagement and progression with their learning, but it is possible to see how the hits linked with attendance and final performance, and this is useful to the module tutors to help them design the more effective online materials. While the insights from the study are limited to the exploration of the interaction with Bb on two engineering modules, and without further examination across other subject areas, no claim to generalisability of the findings can be made; nonetheless, the approach to the data collection and the findings may help to assist tutors and programme managers when designing module guidelines and structuring course materials.

The research methodology

A quantitative approach to data collection was employed. According to Aliaga and Gunderson (2000), the quantitative method is defined as 'explaining phenomena by collecting and analysing the numerical data through mathematically based methods in particular statistics'. Quantitative methods are frequently described as deductive in nature, in the sense that inferences from tests of statistical hypotheses lead to general inferences about characteristics of a population (Bryman and Bell 2015).

Hypothesis

In this study, it was hypothesised that *student engagement via Bb hit rates has a significant relationship or correlation with class attendance, engagement and performance*.

The study's aim was to explore any connection between the students' Bb hits and their attendance in their programme of study, engagement and performance. A statistical analysis test for the correlation between students' online activities via Bb hits and class attendance was performed to understand the depth of the relationship between student engagement and its impact on student performance. This relationship will help inform further research into how best to enhance teaching and learning practices through the redesign of the module structure, inform guidelines and assist us in understanding the way students utilise online learning resources via the Bb system.

To minimise the impact of subject type and student cohort, two different course modules were included in the study with two levels of student performance in the civil engineering programmes. The study was based on secondary data analysis, which was

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gathered from the university Bb system and attendance records to reflect student use of online resources and physical participation in the classrooms.

The design of the study contained two aspects. The first aspect of the study aimed to examine the correlation between student engagement via online activities measured through Bb hit rates and student module performance. The online activities or hits were recorded under the course evaluation tool in the Bb system, based on the use of electronic resources, over the whole academic year in a course module titled 'Construction Practice' at Level 4 and the 'Risk Management' module at Level 6 in the civil engineering programme. The aim of the second aspect of the study was to identify any correlation that existed between class attendance and module performance of the student at Level 4 and Level 6.

Data collection for research

The total number of students included in the study was 82 and 88 at Levels 4 and 6, respectively. The details of Bb clicks, records of class attendance and the final grade of each student on the module, at both levels, are shown in Appendix A. The secondary data for statistical analysis in the study was collected under three aspects or attributes of student engagement as detailed below:

(1) *Performance*: For each module, performance data in terms of the final grade of each student were collected at both levels (Column D of each module, Appendix A).
(2) *Attendance*: Class attendance was used as an indicator of levels of student engagement with teaching and tutorials. Both modules comprised a mix of class-based and lab- or field-based teaching (Column C, Appendix A).
(3) *Bb hits*: Access to the online learning resources was collected using the course evaluation–reporting tool via Bb. The magnitude of intended usage of e-resources held on the Bb system was considered as indicative of the level of students' online engagement. Both the modules had a distinctive design structure holding a wide range of e-learning resources, course administration, information, announcement, discussion blogs and assessment tools on Bb. These comprised folders containing lecture-supporting resource items, mostly PowerPoint slides, lectures notes, worksheets from practical and tutorial classes and links to other e-resources and online reading materials. The course reporting tool logged a click or hit each time a folder, page or item (uploaded e-resource or website URL) was accessed by a student within these areas. It was assumed that the total number of logins was largely used for productive purposes in their study rather than getting information about hit rates, which is determined by the site design structure. The number of hits from each student recorded by Bb is shown in Appendix A (Column A shows student ID and Column B shows the number of Bb hits).

Results from data analysis

Student engagement and performance at Level 4

The results of the data analysis are presented in the tables and graphs. Firstly, student engagement in terms of the Bb clicks and performance in relation to the final grade

of students at Level 4 in the course module was analysed using SPSS. Two frequency graphs with student ID and mean values of Bb hits, attendance and final grade were drawn (Figures 1 and 2). Figure 1 reveals that there is a similar trend of fluctuation between student engagement and student performance but fails to identify what types

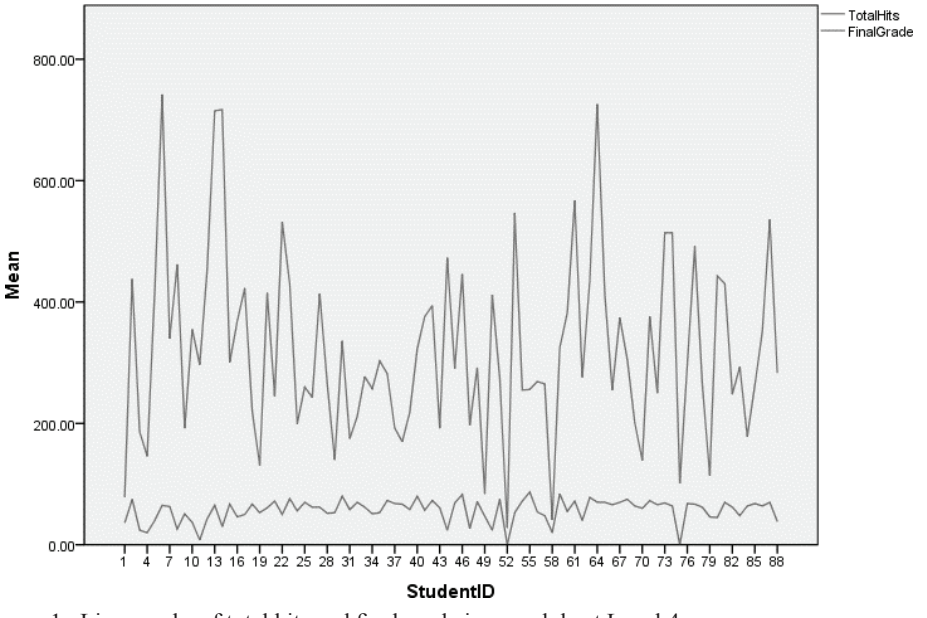

Figure 1. Line graphs of total hits and final grade in a module at Level 4.

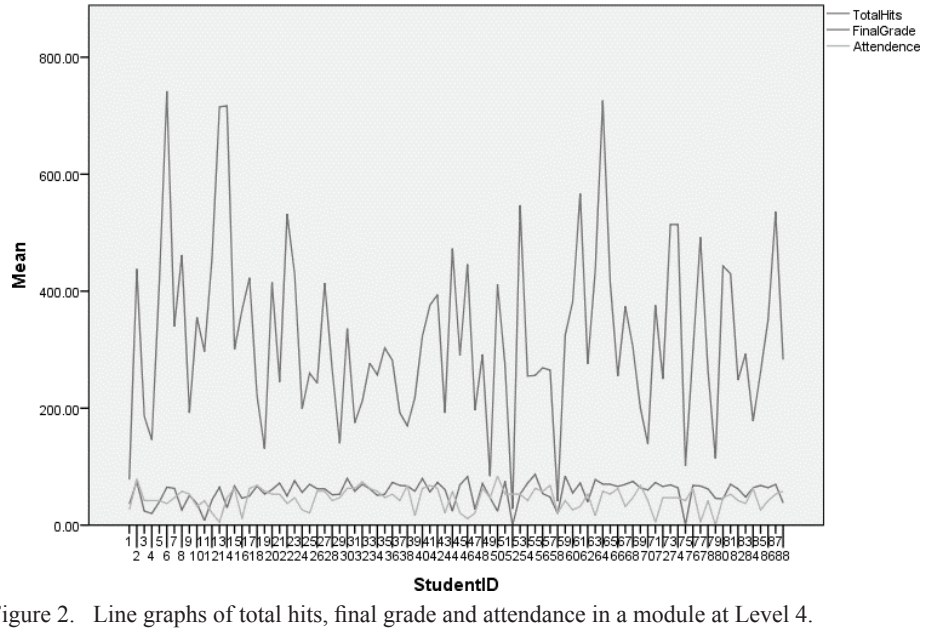

Figure 2. Line graphs of total hits, final grade and attendance in a module at Level 4.

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of correlation exists between them. Similarly, Figure 2 shows that there is a slightly different frequency between attendance and performance, but the line graph does not identify any type of existing correlation between them. Hence, a *t*-test was then conducted to identify the positive or negative correlation between student performance and engagement at both levels. The results of the paired sample statistics, that is, the paired sample correlation and paired sample test, are presented in Tables 2, 3 and 4.

The *t*-test results of the paired sample correlation analysis revealed that there is significant positive correlation between Bb hits and the final grade (0.52, $p = 0.00 < 0.05$) and between attendance and final grade (0.59, $p = 0.00 < 0.05$) (see Table 3). However, when the paired sample test was conducted at a 95% confidence level, it was found that student engagement in terms of Bb hits had highly significant correlation with performance with a positive *t*-value ($t = 9.99$, $p = 0.00 < 0.05$). In contrast,

Table 2. Paired Samples Statistics at level 4.

		Mean	*N*	Std. Deviation	Std. Error Mean
Pair 1	Total Bb Hits	149.19	81	95.50	10.61
	Final Grade	53.65	81	22.67	2.52
Pair 2	Attendance	50.22	81	27.94	3.10
	Final Grade	53.65	81	22.67	2.52
Pair 3	Module Content	123.15	81	88.03	9.78
	Final Grade	53.65	81	22.67	2.52
Pair 4	Assignment	19.77	81	10.70	1.19
	Final Grade	53.65	81	22.67	2.52

Table 3. Paired Samples Correlations at level 4.

		N	Correlation	Sig.
Pair 1	Total Bb Hits & Final Grade	81	.52	.00
Pair 2	Attendance & Final Grade	81	.59	.00
Pair 3	Module Content & Grade	81	.40	.00
Pair 4	Assignment & Final Grade	81	.39	.00

Table 4. Paired Samples Test at level 4.

		Paired Differences					*t*	*df*	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval				
					Lower	Upper			
Pair 1	Total Bb Hits-Final Grade	95.53	86.03	9.56	76.51	114.55	9.99	80	0.00
Pair 2	Attendance-Final Grade	–3.43	23.39	2.60	–8.61	1.74	–0.32	80	0.19
Pair 3	Module -Final grade	69.49	79.25	8.81	51.97	87.02	7.89	80	0.00
Pair 4	Assignment-Final Grade	–3.89	20.96	2.33	–8.52	–9.25	–0.55	80	0.00

the paired sample test between students' attendance and final grades reveals an insignificant result with negative *t*-values ($t = -1.32$, $p = 0.19 > 0.05$). The details of the paired test results are shown in Table 4. Moreover, the results confirm that student performance was positively correlated with student engagement in terms of Bb hits compared to class attendance, as an initial finding from the study. An additional regression analysis using SPSS was conducted to understand the importance and effect on student performance from student engagement aspects.

Results of t-test (Bb hits and final grade) at Level 4

A regression analysis with automatic linear modelling was then conducted to analyse the linear effect on student performance (final grade) from the aspect of student engagement indicators (such as Bb hits and attendance). The results of the regression analysis are shown in Figure 3. The student performance on the module at Level 4 (mean = 55.74, SD = 20.57 and $N = 77$) shows the linear effect with respect to Bb hits and attendance (see Figure 3). The linear modelling results reveal that online activities related to exam preparation have more consequence compared to online activities associated with coursework. Figure 4 shows that the estimated mean has a significant effect on the final grade (student performance) from the engagement aspects of Bb hits and attendance. This supports the argument that there exists a positive linear relationship between student engagement and performance. The linear relation of student performance with respect to Bb hits indicates that it was more significant than class attendance for the Level 4 module of the programme.

Student engagement and performance at Level 6

The results of the data analysis are presented in the tables and graphs. Firstly, the student engagement aspect (in terms of Bb clicks vs final grade) and student performance aspect (in terms of attendance vs final grade) at Level 6 was analysed

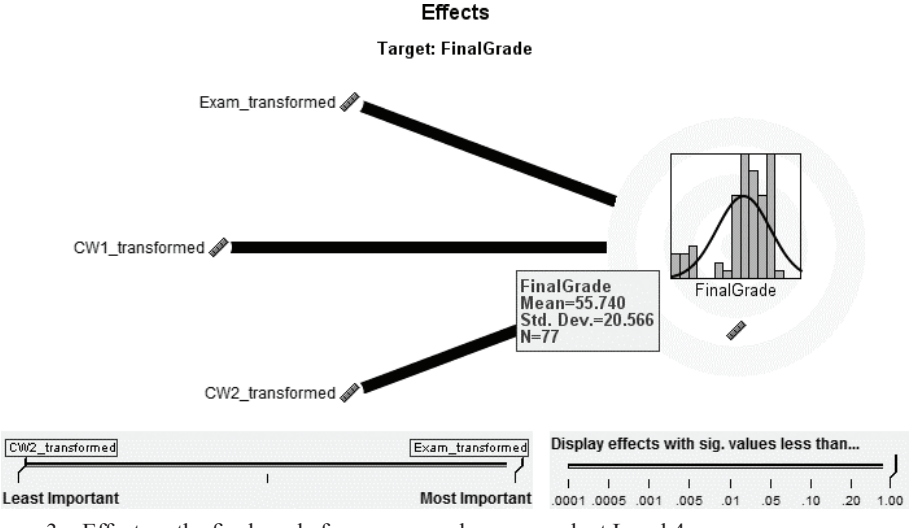

Figure 3. Effect on the final grade from exam and coursework at Level 4.

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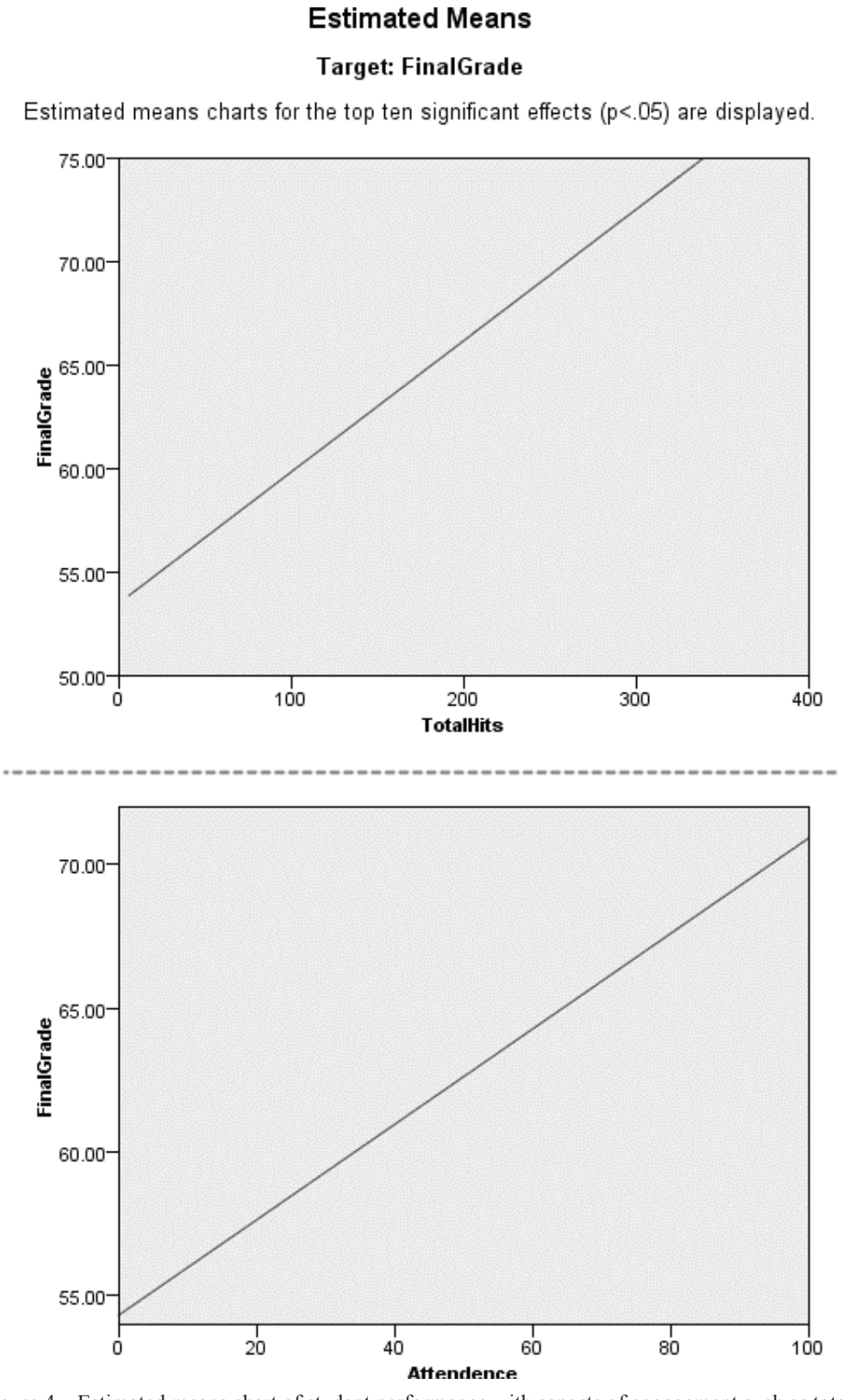

Figure 4. Estimated means chart of student performance with aspects of engagement such as total hits and attendance at Level 4.

using SPSS. Two frequency graphs with student ID and mean values of Bb hits, attendance and final grade were drawn and these are presented in Figures 5 and 6. Figure 5 reveals that there is a similar trend of fluctuation between student engagement aspects and their performance, but from the line graph it is not possible to identify the types of correlation that exists between them. Similarly, Figure 6 shows a slightly different frequency between attendance and performance and the line graph does not show the correlations between them. Therefore, a *t*-test was conducted to identify the correlation

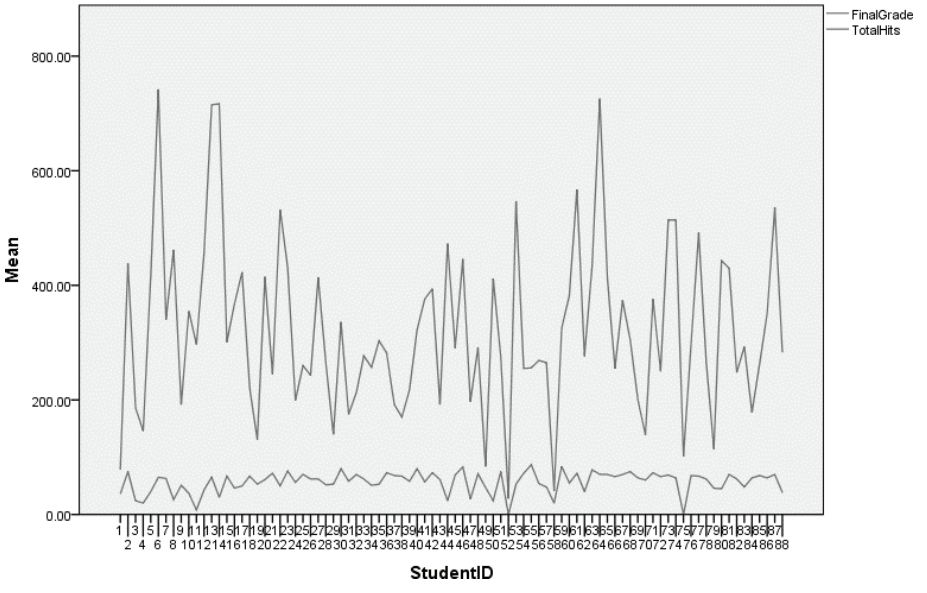

Figure 5. Line graphs of total hits and final grade on a module at Level 6.

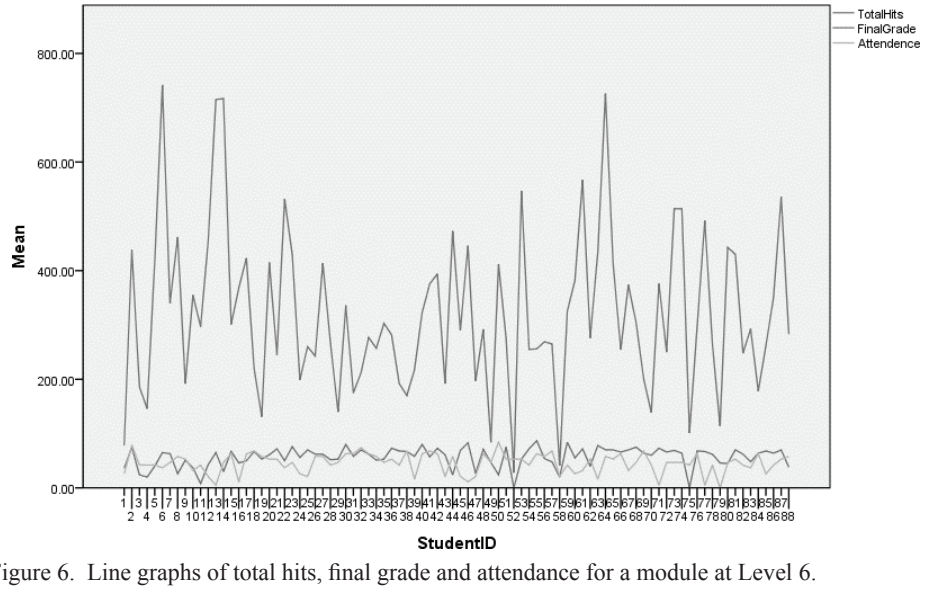

Figure 6. Line graphs of total hits, final grade and attendance for a module at Level 6.

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between student performance and engagement at both levels. The statistical analysis of the *t*-test with the paired sample correlation were performed and the results are presented in Tables 5, 6 and 7. The *t*-test results of the paired sample show that significant correlation exists between the student engagement aspect of the Bb hits and the final grade (0.24, $p = 0.02<0.05$) but an insignificant correlation exists between student attendance and the final grade (0.06, $p = 0.00<0.61$) (please see Table 6). On the other hand, when a paired sample *t*-test was conducted at 95% confidence level, it was found that student engagement and performance was highly significant with a positive *t*-value ($t = 16.93$, $p = 0.00<0.05$), whereas the paired test between student attendance and the final grade showed significant results but a negative *t*-value ($t = -4.16$, $p = 0.00 <0.05$) (please see Table 7).

Table 5. Paired Samples Statistics at level 6.

		Mean	*N*	Std. Deviation	Std. Error Mean
Pair 1	Assignment	77.81	88	41.57	4.43
	Final Grade	56.74	88	18.60	1.98
Pair 2	Module Content	237.16	88	116.45	12.41
	Final Grade	56.74	88	18.60	1.98
Pair 3	Total Bb Hits	321.68	88	150.22	16.01
	Final Grade	56.74	88	18.60	1.98
Pair 4	Attendance	45.53	88	18.20	1.94
	Final Grade	56.74	88	18.60	1.98

Table 6. Paired Samples Correlations at level 6.

		N	Correlation	Sig.
Pair 1	Assignment & Final Grade	88	0.25	0.02
Pair 2	Module Content & Final Grade	88	0.23	0.03
Pair 3	Total Bb Hits & Final Grade	88	0.24	0.02
Pair 4	Attendance & Final Grade	88	0.06	0.61

Table 7. Paired Samples Test at level 6.

		Paired Differences					*t*	*df*	Sig. 2-tailed
		Mean	Std. Deviation	Std. Err. Mean	95% Confidence Interval				
					Lower	Upper			
Pair 1	Assignment-Final Grade	21.07	41.02	4.37	12.38	29.76	4.82	87	0.00
Pair 2	Module Final Grade	180.42	113.64	12.11	156.34	204.50	14.89	87	0.00
Pair 3	Bb Hits - Final Grade	264.94	146.80	15.65	233.84	296.05	16.93	87	0.00
Pair 4	Attendance - Final Grade	–11.21	25.29	2.70	–6.56	–5.85	–4.16	87	0.00

These results confirm that student performance has some relationship with Bb hits compared to student attendance. A regression analysis was also conducted with automatic linear modelling using SPSS to understand the importance and consequence on student performance from the engagement aspects. The results are shown in Figures 7 and 8.

t-*test (Bb hits and final grade) at Level 6*

Moreover, the results and discussions about the regression analysis, which was conducted with linear modelling, was aimed at identifying the type of relationship between student performance and the engagement aspects.

The linear modelling results shown in Figure 5 reveal that online activities via Bb hits are related to exams and have the most important impact compared to online activities in respect of coursework assignments. The student performance on the coursework assignment at Level 6 (mean = 56.74, SD = 18.60 and N = 88) indicates the linear relationship between Bb hits and attendance (please see Figure 7). Figure 8 also reveals that the estimated mean has a significant linear relationship on the final grade from the viewpoints of engagement indicators (BB clicks and attendance). This demonstrates the existence of a linear relationship between student engagement and performance. The linear relation of student performance with respect to Bb hits has less impact than class attendance at Level 6.

Discussion of the findings

From the statistical analysis of the research data, the findings were significant at both Levels 4 and 6. Firstly, it was recognised that student performance had a positive correlation with student engagement from the aspect of Bb hits at both Levels 4 and 6, but the types and the levels of correlation were different at both levels. One of the results showed that class attendance at Level 4 was significantly related to student performance but it was insignificant at Level 6.

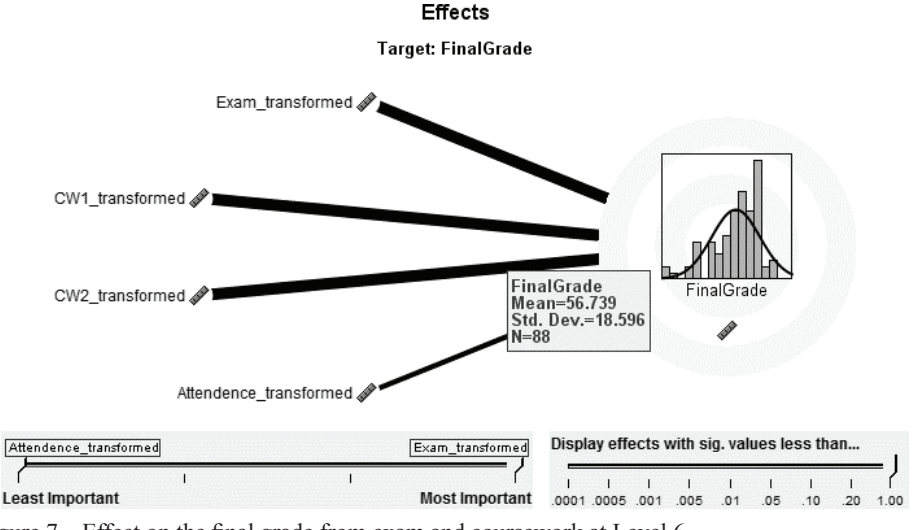

Figure 7. Effect on the final grade from exam and coursework at Level 6.

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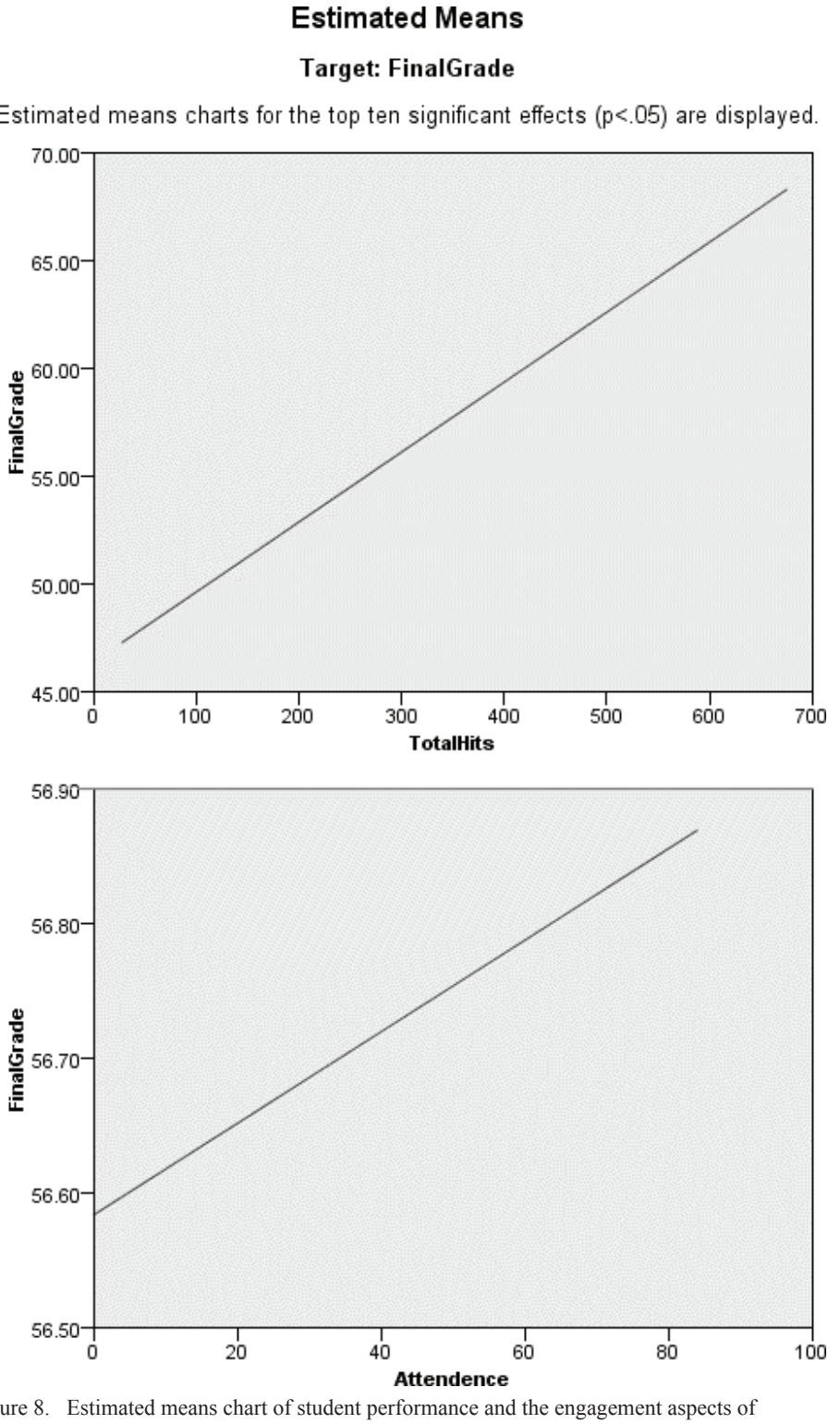

Figure 8. Estimated means chart of student performance and the engagement aspects of Blackboard hits and attendance at Level 6.

Secondly, the other key finding was that student engagement from the aspect of Bb hits had a significant and positive connection in improving student performance at both levels, but student engagement as measured by attendance had an insignificant impact on performance. The study results also confirmed that student engagement had a linear effect on the student performance from the regression analysis. This exposed the issue that students need to be involved more in online activities in order to improve their performance in a course module. From these results, it could be argued that the results might be different in other subject areas because of the nature and complexity of different modules, where various levels of online activities take place. For example, lab-based or field-based modules need active participation compared to class-based modules; however, online activities can help to improve student understanding and performance.

Conclusion

A review of the literature illustrates the range and complexity of advancements in Web-based technologies and reveals the equally diverse ways that students utilise the e-resources available to them (Wang 2015). In this study, the findings showed that student performance had a positive and significant correlation with student engagement at both Levels 4 and 6 in the civil engineering programme; however, both types and level of correlation were found to be diverse at both levels. While class attendance was significantly related to student performance at Level 4, the relationship was shown to be insignificant at Level 6; however, from the regression analysis test, the results also confirmed that student engagement showed a linear relationship. This suggests that students' involvement in online activities could help to improve their performance on a module. Of course, when various levels of online activities take place in the programmes of study, it can be argued that the results might be variable in other modules because of the nature and complexity of different subject areas.

Since Marton and Säljö (1976) first introduced the concept that students take different approaches to how they learn a subject, the extensive and rich literature on all aspects of the student learning experience has contributed to the knowledge of the intricacy of students' relationship with their own learning. Across and within different subject domains, students employ a range of deep, surface and strategic approaches to their studies (see *inter alia* Bryson and Hand 2007; Fielding 2006; Gibbs 1992; Holmes 2015). Emerging research on the use of digital technologies now explores the intersection between the convergence of learning theories and digital technologies (Altuna and Larek 2015), and implementing blended learning frameworks could be one of the ways forward in research into the advantages and challenges of e-learning (Adekola, Dale, and Gardiner 2017). The advancements in technology-enhanced learning and teaching over the past decade adds another dimension to this complex relationship, so how best to utilise electronic material to encourage students' engagement with their studies remains an ongoing area for further research.

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Appendix A. Information on student engagement and attendance at Levels 4 and 6.

Level 4 module				Level 6 module			
A	B	C	D	A	B	C	D
Student ID No	Bb hits (Total hits)	Attendance %	Final grade	Student ID No	Bb Hits (Total hits)	Attendance %	Final grade
1	17	0	0	1	78	26	36
2	145	48	61	2	438	79	75
3	186	40	48	3	186	42	24
4	190	76	59	4	146	42	20
5	136	92	57	5	416	42	40
6	172	80	55	6	742	37	65
7	119	40	40	7	340	47	63
8	57	68	48	8	462	58	26
9	120	60	53	9	192	53	51
10	107	24	58	10	355	32	37
11	164	20	56	11	297	42	8
12	179	48	71	12	455	21	43
13	93	44	48	13	715	5	65
14	78	12	53	14	717	47	30
15	168	68	74	15	301	63	67
16	84	24	47	16	368	11	46
17	172	16	71	17	423	63	50
18	178	80	60	18	221	68	67
19	325	100	76	19	131	58	53
20	60	24	51	20	415	53	61
21	177	28	69	21	245	53	72
22	2	0	0	22	532	37	50
23	98	32	9	23	430	47	76
24	281	68	77	24	199	26	56
25	152	40	69	25	260	21	70
26	154	60	65	26	243	58	62
27	90	28	46	27	414	58	62
28	161	96	72	28	266	42	52
29	272	56	65	29	140	47	53
30	335	88	53	30	336	63	80
31	145	0	54	31	175	63	58
32	118	44	48	32	212	74	70
33	86	44	66	33	277	63	62
34	127	56	80	34	257	58	51
35	223	64	77	35	303	47	53
36	280	36	72	36	282	53	73
37	143	40	51	37	192	42	68
38	93	76	62	38	170	68	67
39	124	36	20	39	218	16	58
40	6	44	11	40	323	63	80
41	144	20	58	41	376	68	57
42	23	64	58	42	394	63	73
43	124	32	9	43	192	21	61
44	125	24	61	44	473	58	24
45	89	52	56	45	290	21	69

Appendix A. (*Continued*)

Level 4 module				Level 6 module			
A	B	C	D	A	B	C	D
Student ID No	Bb hits (Total hits)	Attendance	Final grade %	Student ID No	Bb Hits (Total hits)	Attendance	Final grade %
46	131	88	76	46	446	11	83
47	272	80	69	47	197	21	27
48	118	56	60	48	292	63	71
49	138	52	69	49	84	47	47
50	0	0	0	50	412	84	24
51	222	84	80	51	274	53	75
52	138	24	48	52	28	53	0
53	266	88	77	53	547	53	53
54	238	56	55	54	255	42	72
55	77	32	63	55	256	63	87
56	644	52	75	56	269	58	54
57	150	44	70	57	265	68	48
58	54	28	19	58	41	21	20
59	52	84	51	59	325	42	84
60	25	32	0	60	382	26	55
61	121	92	48	61	567	32	72
62	166	56	76	62	276	53	40
63	274	88	73	63	435	16	78
64	9	28	0	64	726	58	70
65	44	8	21	65	413	53	70
66	195	96	75	66	255	63	66
67	328	88	85	67	374	32	70
68	156	36	68	68	305	47	75
69	161	80	64	69	201	68	64
70	147	76	76	70	139	42	60
71	228	96	64	71	376	5	73
72	6	12	0	72	250	47	66
73	163	24	53	73	514	47	69
74	120	92	56	74	514	47	64
75	165	88	73	75	101	42	0
76	218	64	74	76	297	63	68
77	6	0	0	77	492	5	67
78	196	52	69	78	265	42	62
79	53	8	19	79	114	0	46
80	159	44	52	80	443	47	45
81	191	40	60	81	430	53	70
82	119	8	34	82	248	42	62
				83	293	37	48
				84	178	63	64
				85	262	26	68
				86	351	42	64
				87	536	53	70
				88	283	58	38

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