



Cape Peninsula University of Technology, Cape Town, South Africa



WileyPLUS Web-Based Homework System on Student Performance



Course – First Year Introductory Engineering and Physics Course



Number of Students – 34

Approach

The study was conducted in the 2014 academic year at the Department of Chemical Engineering at Cape Peninsula University of Technology, Cape Town, South Africa. The 34 participants of the study were out of 47 first year students who were enrolled for the Extended Curriculum Programme (ECP) Chemical Engineer National Diploma (ND) course.

The ECP programme has been designed to support students who are enrolled in Chemical Engineering with less than 50 per cent pass rate in high school Mathematics and Physical Sciences. These students require immediate, high quality feedback.

The study investigated how the WileyPLUS Web-Based Homework System impacted on the students' paper based tutorial mock test, mid-term test and Final Integrated Summative Assessment (FISA) performance. Quantitative and qualitative methods of collecting data were used in this study. Chemical Engineering Extended Curriculum Programme students who enrolled for the introductory Physics course responded to a survey and participated in focus group interviews to gauge their perceptions and experiences of the use of the WileyPLUS Web-Based Homework System.

Setting / Rationale for the Trial

Faculty recognised the value of homework assessment, feedback on the assessment and its impact on academic performance but providing students with instant individual feedback was time consuming. These challenges were exaggerated on the Extended Curriculum Programme (ECP) Chemical Engineer National Diploma (ND) course where the demand for high quality feedback is critical.

Whilst the inclusion of technology in the classroom has significantly impacted the way students learn and access educational materials across the globe, in South Africa there has been some nervousness about using integrated technology solutions. This is partly due to the affordability factor but also due to the unknown technical support that might be required to effectively deliver it.

During the study, WileyPLUS was used to provide, submit, and grade work and to monitor at-risk students on each weekly homework assignment. Students were given 96 hours to submit the web-based homework assignment, which was based on the sections of the chapter being taught in the classroom. In addition to providing students with instant feedback, WileyPLUS also provides students with essential learning tools including video, animation, PowerPoint presentations and relevant e-Texts, which are used by faculty and students.

Resources Used / The Trial

When working with WileyPLUS, students received individual feedback on the completed sections of the physics exercise each time they clicked the <Submit Answer> button.

After one attempt of the homework assignments, students received a publisher-provided hint in questions to which they had given a wrong answer. On the second attempt, all parts of the exercise were graded and the scores were recorded on the grade book. Students were given the option to view the solution. Students were able to view an online grade book in WileyPLUS to see the total score for the web-portion of the assignment along with class averages. Student emails and a closed Facebook group were used for all course communication.



Evaluation – Instructors

The study increased the level of interaction with faculty peers, extended the time spent on course work and enhanced students' collaboration outside the classroom. WileyPLUS enabled faculty to deliver instant individualised student feedback on homework assignments.

“The inclusion of affordable technology in the classroom has revolutionised our Extended Curriculum Programme. WileyPLUS has significantly impacted the way students learn and access educational materials.

The need for providing students with individual feedback on a course such as physics was the motivation for me to pilot the WileyPLUS Web-Based Homework System. Initially, I looked at what other countries were doing to address the same problem. I adopted WileyPLUS and conducted research to evaluate student experience. The results I obtained indicated that there was a strong positive correlation between students' Web-Based Performance to paper based tutorial test, main test and FISA. The study helped me to secure finance for this year (2015), from a university teaching grant to fund all the students on the Chemical Engineering Extended Curriculum Program (ECP) with WileyPLUS.”

Moses Basitere, Extended Curriculum Programme, Cape Peninsula University of Technology, Cape Town, South Africa

Evaluation – Students

73 per cent of students from the survey participated in the focus group interviews and shared their positive experience of using WileyPLUS. Over 90 per cent of the students indicated that WileyPLUS online exercise hints were helpful in giving students clues of how to solve a problem and enabled them to understand concepts. The usefulness of hints was also confirmed during students' focus group interviews.

Some students indicated that they couldn't afford internet access so using WileyPLUS at home was difficult so they used the printed version of the related Wiley textbook from the library. These students read and prepared for the assignment at home and completed the online assignment at the university as free internet access was available on campus.

KEY FINDINGS:

- Over 75 per cent of students reported that WileyPLUS Web-Based Homework System enhanced their learning of the physics course content.
- Over 80 per cent of students indicated that they spent less time practicing course concepts when homework was not collected and graded.
- Over 60 per cent of students indicated that they did not prefer paper-based homework with no feedback, 15 per cent highlighted that they preferred paper-based homework with no individual feedback compared to web-based homework with feedback and 21 per cent neither agreed nor disagreed.
- Over 59 per cent of students reported that they completed their homework assignment at home.

"I liked the hints within WileyPLUS very much in the sense that it provided more time to actually do the questions and then if you went wrong it gives you a hint on how to tackle it."

Student

"What I liked about WileyPLUS is the videos and the hints. After reading, you do some questions and then if the questions are not clear, we view the clips, we watch the videos and then they explain how it's done. And if you still don't understand, they give you a hint and then you do it and then you get it correct."

Student



SUMMARY

Both faculty and students reported that the WileyPLUS Web-Based Homework System showed a strong positive correlation between students' Web-Based marks and marks students' obtained in the tutorial mock test, mid-term test and the FISA. Furthermore students indicated that they preferred web-based homework with individual feedback compared to ungraded paper-based homework as it enhanced their learning. There was an overwhelming agreement amongst the students that if homework was not collected and graded, they would spend less time practising course concepts.

The study demonstrated that WileyPLUS helped students and faculty to benefit from more efficient and effective individualised feedback. The provision of hyperlinks to other texts also resulted in students taking full control of their independent learning.

Since the trial, Cape Peninsula University of Technology has agreed to trial more WileyPLUS courses for different modules.