How Technology Causes a Revolution in Education
And how students benefit
How do students use the iPad for educational purposes and how does this support learning?

The most common technologies used are laptops, pen and paper and mobile phones. Compared to those, the iPad has increased usability, portability and accessibility.

There are eight different tasks that students perform with the iPad. Moreover, there is a variety of environments where students make use of the iPad.

Environment, tasks and the iPad are strongly related. This influences how students use the iPad.
Difference of iPad compared to laptop, paper and phone

Those are the most used technologies in education

Compared to pen and paper:
- More pleasant physical design
- Smaller compared to books
- Possibility to store in the cloud
- Better aesthetics of the applications
- Search possibilities on the internet
- Immediate feedback
- Virtual keyboard

Compared to laptop:
- Smaller
- Less weight
- No need for accessories such as bag
- Smaller screen size
- Quicker
- Longer battery life
- Virtual keyboard

Compared to phone:
- Increased screen size

Vrije Universiteit Amsterdam, 2015
These changes result in an increased experience in Accessibility, Usability and Portability

And still I think it’s easier, because I do not have to access internet to open up study exercises because it’s just on it. It might be a bit inconvenient in the beginning to get everything on the iPad because all links are on iTunes U. But once you have done that, you just have everything accessible. And that’s super easy!

And then, with that iPad I can just quickly look some small things up and just... in that case I will read that one article which I otherwise would never have read.

Where I use the iPad next to the university? Well, on my way to somewhere. Definitely in the train, in the metro, in the airplane. Yes, that’s specifically easy with my iPad of course, you can grab it easily everywhere. Also when I’m waiting for something: I can just quickly grab it.
The iPad is used for different tasks and different environments

Tasks
- Make notes
- Read articles
- Make summaries
- Make pictures
- Record sound
- Retrieve information
- Watch lectures
- Retrieve syllabus

Environments
- Lecture halls
- Study groups
- Experiment rooms
- Internships
- Home
- Library
- On the Move
- Other*

* unusual places such as babysitting, commissions, board meetings

Environments where the iPad is used
Tasks, experience and environment are interrelated
This determines how students perform tasks

Accessibility, usability and portability enable students to perform the task.

Different environments emphasize different experiences. On the move, portability is more important. During lectures, usability and accessibility are more important.

It depends on the environment which tasks are performed. During lectures students make notes, but they do not make summaries of articles.
Previous research focussed on either linkages

But no integrated approach has been taken

Experience

Hwang & Wu (2014)
The added value of portability, usability and accessibility in different environments

Hyman (2014)
How electronic devices enable students to perform different tasks

Tasks

Environments

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UCISA (2015)
How the iPad enables to perform tasks in different environments
Three ways to generate fit
Immediate adoption, modify the iPad or change routines

1. **Immediate fit**
The task that a student would like to perform does not face any constraints from the environment. Moreover, experience is increased compared to other technologies. Therefore, students move from one technology to the other.

Example
During **internships**, students made notes on a small notebook. However, the iPad can increase experience (portability, usability and accessibility) which makes that people use the iPad to make notes in this environment.

2. **Modify the iPad**
The task that a student would like to perform faces constraints by the environment or it is not possible to make full use of the experience an iPad offers. Consequently, students modify the iPad to fit the environment or increase experience.

Example
During **lectures**, students made notes on paper or their laptop. However, the iPad can increase experience (portability, usability and accessibility) which makes that people use the iPad to make notes in this environment. However, students cannot catch up with the speed of the lecturer because they cannot type fast enough. Therefore, students extend the iPad by adding a physical keyboard.
Three ways to generate fit

Immediate adoption, modify the iPad or change routines

**Change routines**
The task that a student would like to perform faces constraints by the environment or it is not possible to make full use of the experience an iPad offers. Consequently, students change their normal way of doing things to fit the environment or increase experience.

**Example**
When on the move, students did not read articles. However, the iPad can increase experience (portability, usability and accessibility) which makes that people use the iPad to read articles. However, students cannot access their articles which are stored on other devices. Therefore, students email documents to themselves so they can access the documents in their inbox.

Please note that there is a large variety of ways that tasks can be performed due to the number of environments, tasks and experiences which are all interrelated. The most prevalent take away is the finding that students make use of the iPad to perform different tasks and that depending on the environment and the experiences they replace or complement other technologies immediately or after changes.
Consequences for students, teachers and creators of content

Students
Students are not fully aware of the opportunities that the iPad offers. For example, cloud opportunities exist but are not fully used.

More education about the use of iPads could enhance experience

Lecturers
Since students study at a large number of places, it is valuable to students to offer content digitally. This would increase opportunities for students.

Delivering content digitally supports students significantly

Content Creators
The iPad offers opportunities incomparable to other devices. To fully exploit these, innovative ways should be found to reach students.

Digital content should focus on increased usability
iBooks at VUMc School of Medical Sciences

iBooks increase usability but decreases accessibility

Usability: ability to reach goals

Possibilities to modify content
- What I really like is that I can make marks inside the document

Aesthetics of iBooks
- I think it just looks way better compared to PDF!
- You can easily click on the page you want to go to - lectures or study groups - and it immediately brings you there without scrolling
- I mainly use those iBooks because you can fill in exercises immediately

Immediate response
- Do you have your iPad with you? Otherwise we can’t do anything haha

Click to required content
- I have to take my iPad with me, because for me it is the only way to access the syllabus

Make snapshots of content
- We always have to make drawings of stuff under the microscope. But I just take pictures instead haha!

Accessibility: possibility to access content

Only accessible on one device
- We always have to make drawings of stuff under the microscope. But I just take pictures instead haha!

Only accessible via iOS
- Do you have your iPad with you? Otherwise we can’t do anything haha

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The iPad offers valuable opportunities
These should be exploited by students, lecturers and creators
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