Appsolute Padagogy

Reviewing digital functionality of Swedish iPad apps for early math and literacy skills

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Appsolute learning?

Educational iPad apps are used in many schools and make wide claims to "*accelerate learning*", mainly because the interactivity of an app can do things that a book cannot do. But what are the key influences of an app on the learning process?

Aim

We aim to review the digital functionality of Swedish educational apps with a focus on how the automated feedback system directs the learning tasks.

Research questions

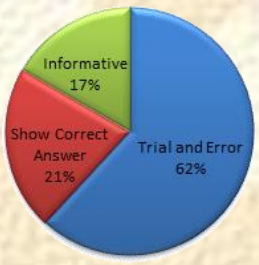
I. What kinds of feedback are used in Swedish apps for training early math and literacy skills?
II. How does the content of feedback potentially aid or limit students' progress towards the knowledge goal?

Review-in-progress

Because Swedish-language apps are relatively few, we decided to survey **all** Swedish educational apps resulting from the following search criteria in AppStore: category "Education", age categories 6-11, "matematik" (n=30) and "läsa svenska" and "skriva svenska" (n=12). Only apps with subject-relevant interactive tasks (eg. adding numbers, spelling words) were included for review.

I. Feedback after an incorrect response is typically uninformative

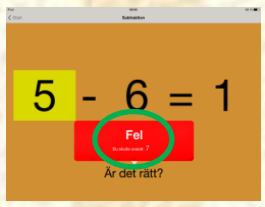
Apps (N=42)



Trial and error: Error sound or shake indicates incorrect answer. Student tries until correct answer is given.

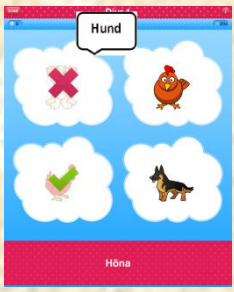
Show correct answer: Displays the correct answer immediately or delayed after student's response.

Informative: Adds information to the task at hand, eg. states the result of an incorrect response or provides an explanation.



"Subtraction Practice": shows the correct answer after an incorrect response

"Zcooly raketen": informs that the result of the response does not match the intended answer.



"Boca" (Swedish): informs by reading aloud the incorrect response (eg. a dog is selected instead of a hen).

- The majority of apps use only uninformative, trial-and-error-type feedback (62%).
- 17% of apps presents some information beyond the correct answer, mostly limited to simple facts.

II. Feedback content is often ambiguous

Larkin (2013) categorized 142 math apps by what kind of knowledge they promote (declarative, procedural, conceptual). Applying the same categorization to the Swedish apps indicated an almost exclusive focus on superficial declarative (identifying correct response) or procedural knowledge (counting, spelling). We identified two major features that may affect conceptual understanding, for further investigation:

i) Congruent representations of task and feedback

Bad representation: the task of finding the "neighbour" to 4 becomes a task of finding a matching puzzle piece (with two pieces reading "3"). [Zcooly]

Better representation: the task of finding correct nr of hay sacks to feed the cows allows one-to-one mapping by displaying each cow and the number on screen; hay sacks can be placed

ii) Conceptual mapping of task and knowledge goal

Many apps include tasks of no conceptual relevance to the learning goal, for example "game goals":

- Calculate 8*2 to shoot down a caveman or be killed
- correct answer fuels a spaceship, wrong answer retards it
- Correct calculations prevent collisions with a jetpack-equipped ape
- fill a barrel with baguettes so the professor can fix the hovercraft
- Etc…

Bad task: calculating 100/10 lets you hit a hamster with a funny hat. [Zcooly gruvan]

Better task: use your sword to split numbers in factors (eg. 6=3+3) and avoid the primes – which are unsplittable. [Factor Samurai]

☺ Discussion ☺ = how to proceed?

- As to reviewing apps, how can we formulate qualitative criteria general enough to include the greatest variety of content while being specific enough to capture the apps' key characteristics for learning?
- How can the results be used to inform teachers what makes a pedagogically effective app?