Is explanation overrated?

A research on how explanation affects performance
Abstract

School results are dropping in Sweden and actions are taken by the swedish government to prevent it. This report questions these actions. With a parallel between school and video games, in that they are both about teaching a student/player how to do something, a game is made to test how further explanation of the games mechanics affects the players ability to learn about them. The results are in line with other studies, over-explaining is hurting the players ability to learn about the game.

Referat

Introduction

School and education, and the questions surrounding them, are questions that always have taken a huge role in society. In Sweden, it yet again pops up among the most important questions for the next election, just like it did last year. Education has always been a big question, but recently even more so as the quality of the swedish schools have been dropping for some time and keeps dropping even further.

There’s a lot of speculation on what is wrong with the swedish school system. With this anxiety that comes from not being able to pinpoint what is wrong, there has been a huge upswing in the market of extra lessons and/or help with homework where companies employ teachers and families hire them to help educate their children in the evenings. The swedish government have also invested towards shrinking the class size, which would “Give the teacher more time for each student”. These two ongoing events indicate a belief among the swedish people that further explanation will increase the understanding of a subject. I believe that this is not the case.

Background

I have myself been one of these aforementioned teachers that teach students in the evenings and while working with this I noticed something: If I sit by my student and explain every question in detail, they stop thinking themselves as “I’m doing it for them”. This makes them momentarily worse at what we are studying, stopping to ask about questions they could solve themselves half an hour ago. It is my hypothesis that this effect is not only momentary, but in fact reduces the rate at which students learn. To investigate this phenomenon, I turn towards a field I know more about and can move more freely in: Video Games.

At first sight this parallel may seem farfetched, but videogames and education have more than a few things in common. The game has to teach the player about the game. It has to teach the player about it’s objective, rules, controls and mechanics. Math has to teach the same thing, it has to teach the student about the objective, i.e. what is the right answer, the mathematical rules, the mathematical “controls” meaning what operations can performed, and the mathematical mechanics as in how these operations change the equation.

How to best teach a player how to play your game is an extension of the ever ongoing discussion how to best teach people new things. In gaming history, things have gone back and forth quite a bit. To simplify it for a better overview, let’s take one of the bigger game series which has been around throughout all the side trips of game theory: The Legend of Zelda.

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2 http://www.svd.se/nyheter/inrikes/sex-viktiga-fragor-for-valet_8147606.svd
3 http://www.aftonbladet.se/nyheter/valet2010/article12344214.ab
4 http://www.svt.se/nyheter/sverige/svenska-elever-allt-samre
5 http://www.svd.se/nyheter/inrikes/1100-pisa-besked-om-svenska-skolelever_8786228.svd
6 http://www.aftonbladet.se/nyheter/article17949767.ab
7 http://www.sydsvenskan.se/sverige/laxhjalp-vaxande-marknad/
8 http://www.aftonbladet.se/nyheter/article18517560.ab
**Video Game History**

The Legend of Zelda is a game series that has been around since 1987⁹, and it has gone through all the major changes in how to teach the player how to play. For the first two games, no help was accessible through the game whatsoever, but the third and four games made steps towards hinting the player through dialogue of other characters:

![Screenshot of Legend of Zelda game]

*The player is here given a direction and an explanation of the controls*

This trend was popular in the Super Nintendo era, around 1991-1996¹⁰¹¹, when the next Nintendo console was released. Other big games, like Super Metroid, followed the same fashion: in the first game for the NES there was no tutorial at all, but in the Super Nintendo version they had these short snippets of information given to the player:

![Screenshot of Super Metroid game]

*The player is here as well given a direction and an explanation of the controls*

However, that was the end to the text. As far as bosses, rooms and other problem solving elements inside the game there were no hint systems, help icons or anything of the sort. If compared with teaching a student how to use a new mathematical formula, it would correspond to showing the formula and

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⁹ [http://www.nintendo.se/wii/vc/zelda_no_densetsu](http://www.nintendo.se/wii/vc/zelda_no_densetsu)


explaining how it works, but not giving any examples or solving any questions for the student. Instead, the student would have access to an endless amount of questions (corresponding to the ability to move endlessly inside the game) for which he/she would be notified when a correct answer was given.

This changed drastically in the next wave of games. Let’s have a look at the next Zelda-game, Ocarina of Time. This game was released November 23 1998\textsuperscript{12} and here, a hint system is introduced in the form of a companion to the player who follows him/her and gives hints on enemies. You could say that it is much like a mentor, or even a teacher that you have hired from a company to help your kids with math, if you see what I’m getting at.

\begin{figure}
\centering
\includegraphics[width=\textwidth]{game_screenshot.png}
\caption{A direction is given, and hints on how to defeat an enemy.}
\end{figure}

This hint-system is on demand, it is not forced. The kind of text that would appear in previous Zelda-titles, the text that explains controls and gives you a direction, appears none the less, but the game doesn’t give you these new hints unless you want to. If once again compared with teaching a student how to use a new mathematical formula, it would be the same as before with the addition that the student could ask the teacher for help if the student felt lost or didn’t understand what to do.

This tendency to throw in more text increased for games around this time. It accumulated in the newest Zelda game release on Wii: Skyward Sword which was released in November 20, 2011\textsuperscript{13}. To some game reviewers, this is where things went overboard.

\begin{quote}
“You will not like the first five hours of The Legend of Zelda: Skyward Sword. It’s not because the game begins slowly. It’s because the game doesn’t even properly begin”\textsuperscript{14}
\end{quote}

\begin{quote}
“This is the the fourth dungeon in the Skyward Sword, fifteen some-odd hours in, and we still need to be told four times in a row that ‘this is a key, it unlocks a door? ... according to Nintendo, we are still in the midst of a twenty-five year tutorial.”\textsuperscript{15}
\end{quote}

Despite the heavy critique on how poorly the game handles tutorials, many other game elements were still solid enough for the game to get a very high rating on most of the video-game rating pages such as

\begin{itemize}
\item \textsuperscript{12} http://www.ign.com/games/the-legend-of-zelda-ocarina-of-time/n64-437
\item \textsuperscript{13} http://www.ign.com/games/the-legend-of-zelda-skyward-sword/wii-872155
\item \textsuperscript{14} http://popwatch.ew.com/2011/12/03/legend-zelda-skyward-sword-review-exegesis/
\item \textsuperscript{15} http://www.ghostlittle.com/zelda-skyward-sword-review/
\end{itemize}
metacritic, IGN and Edge\textsuperscript{16,17,18}. On metacritic however, a “user score” is also shown, and it is drastically lower than the scores from the game reviewers. It is not surprising that complaints about how the over explanation can be found in comments from users:

“\textit{Nintendo has removed the features that made older Zelda games popular and successful; searching, thinking, reasoning out challenges. In Skyward Sword you're shown or told at least twice everything you have to do to proceed. Not only are you not given a chance to think for yourself, you're prevented from doing it.}”\textsuperscript{19}

“\textit{And Fi, the games 'Navi', is super annoying, blocking gameplay to reiterate what you have just been told/discovered.}”\textsuperscript{19}

The second comment mentions this game’s companion who goes by the name of “Fi” (where the Ocarina of Time companion goes under the name of “Navi”). How Fi and Navi work is one of the biggest differences between how these two games handles hints. In Skyward Sword, the hints are no longer optional. They are told to you even if you don’t want to. It doesn’t matter if you already know where you want to go, you still have to stop and listen to an explanation of where you should go.

One of the many scenes with this problem is this one. For further emphasis, note that some conversation was left out of this cutscene to only get the most important parts:

\begin{center}
\includegraphics[width=0.5\textwidth]{image}
\end{center}

\begin{center}
\textbf{Hmm... I'm sure they buried it around here someplace, but I can't find it.}
\end{center}

\textsuperscript{16} http://www.metacritic.com/game/wii/the-legend-of-zelda-skyward-sword
\textsuperscript{17} http://www.ign.com/articles/2011/11/11/the-legend-of-zelda-skyward-sword-review
\textsuperscript{18} http://www.edge-online.com/review/legend-zelda-skyward-sword-review/
\textsuperscript{19} http://www.metacritic.com/game/wii/the-legend-of-zelda-skyward-sword/user-reviews?page=2
Yo, Ledd! This is the place, ain't it?
So what is it they buried again?

A key! K-E-Y, KEY!

They busted up the key to that door and hid the pieces all over the place.
The player can now tell what must be done. The five pieces must be found in order to open that door. This is very clearly stated, and the player is ready to go and start looking. Except they are not allowed to, as Fi makes an appearance. No part of this cutscene is skippable, you have to sit through it and watch as Fi re-iterates what you already know and at the same time stopping you from doing it.
This is the kind of hint that Navi would have given if accessed in Ocarina of Time. Here, you do not have that choice and you are forced to listen as the game explains the exact same thing to you again.

Once again the game tells us that we need five pieces in total
This information is also visible by the design of this UI-element

The player is told that the key has five pieces four times in total, and none of the information given on this subject is skippable. On top of this, the game features another hint system. To access it, you use the Nintendo Wii’s Wiimote to look around, and the controller will shake if you are looking in the direction you are supposed to walk, which guides you along the exact path you are supposed to take. The player is not given a direction in this case, the player is given a path to follow. It is clear that the negative feedback is due: This is overdone to the point where it apparently becomes annoying to the player. To once again view this method of teaching in the school-environment, it would be equivalent to explaining the new mathematical formula four times in a row and not allowing students to start working on the questions they need to finish to pass the class during these explanations that they have already heard before.

This was however two years ago, and there have been more recent Zelda games since then. The Legend of Zelda: A Link Between Worlds was released November 22, 201320 and it instead follows the older formula. It is especially evident in the opening sequence where you first get your sword:

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Déjà vu, the player is given a direction and an explanation of the controls

The description is brief and the direction is general, quite a drastic turn back both in time and style. This game receives a high score, like the other zelda games, by game reviewers. This time though, the user score is matched with the game reviewers score on both metacritic and IGN\(^2\)!\(^3\)\(^2\)!\(^3\).

There seems to be a pattern, less text gives a higher score. This pattern also holds true when looking at top rated games from last year. With a few exceptions, they all follow the same formula. There is a tutorial-part in the beginning of the game where the only text available is the text that describes the controls. Everything else is in one way or another explained through level design or character dialogue\(^2\)!\(^4\).

Since the tutorials of all the top rated games are so uniform, is it possible that this is the optimal method to teach players how to play games? Is text only for controls the right way to go, or is even further removal of text a better solution? It’s difficult to find out since different games have different game mechanics, one method might be perfect for one game and some other could be perfect for another game.

**Hypothesis**

Over-explanatory text does not only make the game less enjoyable, but it also in no way helps the player understand the game. On the contrary, the effects are negative. These over-explanations of problems which players can figure out on their own hinders their progress.

**Reasoning for hypothesis**

This effect I have observed while working as a teacher could be related to a psychological phenomenon known as “projective identification”:

“Even if a person in reality isn’t particularly wicked or evil, we can treat that person and relate to that person as if he/she were ... If a person for a long time is subject for such treatment, if everyone treats the individual as if he/she were wicked and evil, it could lead to that person eventually also

\(^2\) http://www.metacritic.com/game/3ds/the-legend-of-zelda-a-link-between-worlds
\(^3\) http://www.ign.com/games/the-legend-of-zelda-3ds-139048/3ds-121949
\(^4\) http://www.edge-online.com/review/the-legend-of-zelda-a-link-between-worlds-review/
perceives him/herself as wicked and evil.”

If the game treats the player as if he/she is of lesser intelligence and not capable of playing the game by
him/herself, this will in the end be the case: Both because the player simply stops thinking since the game
does it for him/her, but also because of projective identification. For the school-environment, the hypothesis
would translate to the opinion that there is no need to explain what has already been explained to the
student. To keep explaining the same thing in the same manner to the student signals that there is nothing
wrong with the explanation, it’s the student who is not smart enough to understand. I believe that long term
exposure to this treatment might make the student feel like they actually are dumb, even though this is
almost never the case.

The concept that explaining further will give people a better understanding is likely the reason that the
market for extra teachers has had such an upswing in Sweden. At first sight, this idea seems to make
sense, and the swedish population seems to agree. However, there is evidence suggesting that this idea is
wrong, and that further explanation is not what makes us understand better, but further experimentation.

In an experiment done by the Department of Computer Science & Engineering at the University of
Washington, the following result among others was reached. This research tested the effects of different
tutorials in three games of varying complexity. Before this bit of text, it was explained that in a game
which needed a lot of previous experience in biology to understand, tutorials were helpful. These two other
games, Refraction and Hello Worlds, are a lot simpler in their input and objectives:

“However, tutorials were not as effective in the other two games. We found no significant effects
for either comparison in Refraction. In Hello Worlds, we found no significant effects for levels
completed and time played, and we found that 3.5% fewer players returned with context-sensitive
tutorials than with no tutorials.”

When someone stops playing a game and never comes back, which eliminates that there could have been
some time constraint, it’s either because they find it boring or because they are stuck and can’t make
progress. Both are effects of not being fully involved in the game itself either by not understanding it’s
mechanics completely or by having your experimentation hindered by orders from the games tutorial-text.
This suggests that explanatory text would decrease the players ability to learn about the game, thus
strengthening the hypothesis.

Method - The Game

To experiment with how explanatory text affects gameplay, it is not optimal to compare how two different
games choose to teach the player and compare the results. Since the two games are different, the
methods they use might be perfect for themselves but not as effective in other games. Therefore, the best
way to test this hypothesis is to have the same game, but with and without explanatory text. Therefore, I
have made a game for this study which on startup randoms if you get to play with text or without. This
configuration is saved for further testing, so it only randoms the first time you start the game. There is also

25 Dynamik i arbetsgrupper - Om gruppprocesser på arbetet by Kjell Granström, s. 45
a script in the background of the game the writes down facts relevant to the study.

The players were told that they would playtest a game I made, no one knew that what was actually testing was how textboxes affected gameplay and no one knew about this script running in the background until they answered the survey which they were only allowed to do once they were done playing. The survey was anonymous, and the testers didn’t know what they were testing. This makes the study a double-blind experiment.

The game designed is a regular 2d-platformer but with a twist. It is true that previous experience in platform games would increase your ability to complete the game. However, the test is a double blind experiment and what group the players end up in is chosen at random. Previous experience in gaming on different platforms, age and other factors that might affect the players ability to learn about a game will be evenly distributed in the two groups and thus cancel out in the final result.

**Teaching controls**

The game itself has 5 inputs in total. You can walk left, you can walk right, you can jump, you can attack and you can “switch”, which is the previously mentioned twist. This is when you switch position with an unphysical point that follows you at an exact distance:

![Game Images]

All problem-solving in the game is based on this game mechanic, and teaching how it works and in what ways you can use it is the point of the game. The first room in the game is designed so that you need to use all the controls to get through:
At 1, the players starting position, you have to move left to advance. At 2, you have to move right. At 3, you cannot move further to the right unless you jump. Similarly at 4 you cannot move further to the right unless you switch as shown in the image below:

You cannot switch through the turret at 5 and advance, you need to destroy it by attacking it to proceed. Thus, if the player has moved past this room, the player has learned all the controls for the game and they also know that they can destroy turrets. This is easily comparable to passing the first test of a course as a student. It is a benchmark for you progress, and you have started learning about this new subject.

Now that the player knows the controls, what else should the game teach them?
Teaching mechanics

Here is a complete list of things the player should learn before the final boss fight:

- You have a limited amount of hp
- You can jump over obstacles
- You can switch through obstacles
- You can jump and switch at the same time through obstacles
- You can jump and attack at the same time

This means that the player has to take damage before the final boss fight. It also means that the remaining four maneuvers have to be tested. Since there has to be some way to measure progress and improvement, the best situation would be if the player could face the final boss twice, once in the start and once at the end. Then it is easy see how much better the player got at the game while playing. The last boss fight can then basically function the same way an exam does. This is exactly what happens in the game. As soon as the player has learned the controls, the player fights the final boss of the game:

Learning damage and health

The first fight with the final boss doesn’t only show the player the final boss, this room also teaches the player about taking damage. In the first of these two pictures, the boss has fired a red laser at the player. In the second picture, the red laser has hit the player, who has bounced back to the left and made a distinct “OW!”-sound. The blue meter to the top left has also decreased, which is the player’s hp:

This is not a fight the player is expected to win, it only has a pedagogical purpose. Thus, once the player has taken 10 points of damage, the alien teleports away and the fight ends.

After the boss fight ends, the player is right in the next room shown one of these. These are referred to as “HP-items”. When you touch an HP-item, you get a portion of your health back. This is visually shown: the blue bar flashes multiple times, a distinct sound is played and the blue bar increases. The player now knows both about taking damage and also how to recover damage taken.
Learning the maneuvers

For the three different maneuvers I designed three different attack patterns. They are the blue laser, the red laser and the purple laser and can be seen below:

You can jump over the blue laser, you can switch through the read laser and you have to jump and switch to move over the purple laser. Furthermore the Alien floats in mid-air, which forces you to jump and attack to hit it. Thus the final boss tests everything the game tries to learn the player, just like a final exam.

The player is shown all of these attack before the first encounter with the final boss ends. The player now has a reason to learn how to dodge these attack, the player is ready to learn about the maneuvers required to defeat the final boss. To allow the player to practice these maneuvers, there are other enemies in the game in the form of turrets. They fire the same type of lasers the Alien does. The player is allowed to practice one turret at a time, which would correspond to having subject-specific lessons and smaller tests during a course.

Learning about the blue laser
The player falls down from the top left and lands at 1. The platforms between 1 and 2 are oriented so that you jump between them the same way you jump over the blue lasers. This is so that the player starts focusing on and practicing the specific maneuver needed to avoid the blue lasers before the maneuver is tested. Once you reach 2, you can switch in behind the right blue turret and destroy it without ever being in harms way. However, the sound and animation of the blue turrets is constantly being played to the player as you do this, helping the player to recognize this pattern and to connect the sound and look of the blue laser with jumping.

When the the player jumps up and switches to point 3, the shots from the turret to the left is flying towards the player but high enough for them to not hit the player, the player is free to safely analyze the situation from a safe position. From here to that blue turret, there is no safe way around the blue shots: The player has to jump over the blue laser, and the player has to do it at least two times to reach that turret. The player has now successfully dodged the blue laser the same way they will dodge it when the Alien attacks with it and is ready to move on to learning about the red laser.

**Learning about the red laser**

This is the introduction of the red laser, the player enters from top left at 1. The red turret will fire one shot that moves away from the player with enough time for the player to react to this and see it. Just like at 3 in the previous picture, the player is free to stay at 1 in this picture for as long as he/she likes as no turrets fire at this position. The situation is also similar with 1-2 in the previous picture, the player is shown the laser first with the player out of harms way. This is important as the player has to be given the time needed to recognize these lasers as the same lasers the Alien fired.
Once the player is ready, the player can move onward and destroy the first red turret. When the player drops down to 2, the turret on the right starts firing. This time, the shots approach the player the same way they would if the alien would have fired them, there is no safe point and the player has to react. To destroy the second red turret, the player has to dodge the red laser the same way the player has to dodge them when the Alien attacks with them. Once the player has passed through these two red turrets, the player knows all the player needs to know about the red lasers.

Learning about the purple laser

To both run, jump and switch at the same time is a bit trickier, so before the game starts teaching this there is a rehearse-area that the player passes through. This area repeats what the player knows already but in slightly different settings, just to make sure that the player has really learned this. This can be compared to a mid-way exam, making sure that all students understand before the class moves on. Once this is done, the player enters the cave, an area that lets the player practice running, jumping and switching at the same time in a safe environment before the purple turrets are introduced:
This is similar to how the blue turrets were introduced, as there was a short area where the maneuver used to dodge the blue laser was used to proceed. Here however the maneuver is more difficult and therefore the area is much larger. To get from 1 to 2 the player has to run, jump and switch in mid-air. If the player falls down, there is no hazard, and you can simply go back to point 1 and try again. To reach point three, the player has to do the run-jump-switch maneuver three times in succession. Once there, the player has to run-jump-switch four times in a row with more strict timing, and then finally the player is let into the room where purple turrets are introduced.

When the only thing you did in the last room was to run-jump-switch, it is easier for the player to figure out that you are supposed to do the same maneuver to dodge the purple laser. Since the player has already practiced the maneuver required to pass the purple turrets, they are simply placed in broad open areas so that the player may dodge them the same way the player would dodge these lasers if the Alien attacked using them.

Now that the player has learned all that he/she needs to learn to defeat the final boss, a last rehearse-corridor is passed through where one of each turret has to be defeated. Then the player faces the exact same final boss in the exact same environment. To defeat the final boss is to pass the final exam of this game, and it is a proof that the player has learned everything the game has to teach. As the players answer the survey, the success-rate of the two groups can be measured and from here what interference the textboxes have on the players ability to learn what the game is teaching will be visible.

**The textboxes**

The textboxes are simple, they just guide the player through these levels and explain what the rooms themselves already explain. They are best explained through images:
Jump over the blue shots

You can switch through the red shots
The textboxes carry on in this manner, with one exception: No textbox explains how to reach HP-items. They are placed outside the path needed to complete the game, and some of them also require maneuvers the game does not teach the player through level design. HP-items take time and experimentation to reach. This means that the survey will not only be able to measure how the textboxes affect the players ability to learn, but also how they affect the players will to experiment. There is already a desirable in-game effect of taking the HP-items, there is no reason to not try to take them. The amount of HP-items the player picks up will therefore correspond to the players will to experiment.
Result

Performance:

<table>
<thead>
<tr>
<th></th>
<th>With textboxes</th>
<th>Without textboxes</th>
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</thead>
<tbody>
<tr>
<td>Players in total</td>
<td>8</td>
<td>4</td>
</tr>
<tr>
<td>Players who beat the game</td>
<td>37.5%</td>
<td>50%</td>
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<tr>
<td>Powerups taken in total</td>
<td>55%</td>
<td>34%</td>
</tr>
<tr>
<td>Powerups taken/life</td>
<td>43%</td>
<td>34%</td>
</tr>
<tr>
<td>Powerups taken/life, not</td>
<td></td>
<td></td>
</tr>
<tr>
<td>counting players who stopped</td>
<td>43%</td>
<td>68%</td>
</tr>
<tr>
<td>playing because they couldn’t</td>
<td></td>
<td></td>
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<tr>
<td>figure out the controls.</td>
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Rating:

<table>
<thead>
<tr>
<th></th>
<th>With textboxes</th>
<th>Without textboxes</th>
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<tbody>
<tr>
<td>Average rating for</td>
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<tr>
<td>Graphics</td>
<td>6.25/10</td>
<td>6.25/10</td>
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<tr>
<td>Gameplay</td>
<td>7/10</td>
<td>7.5/10</td>
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<tr>
<td>Overall</td>
<td>6.75/10</td>
<td>7/10</td>
</tr>
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In total, 12 people playtested the game. This is a small number, sadly, but there were events surrounding the playtest that help increase the quality of this research despite the low number of playtesters. First off, I got a call from one playtester that had stopped playing and refused to continue playing without being told how to remove the blue textboxes. I had to remove this players data from the playtest as I explained what the playtest was about, and the player had now been taught the controls with textboxes and continued the playthrough without textboxes. However, this phonecall demonstrates how annoying some players think these kinds of textboxes are.

A fault in the code led to some other interesting calls as well. If you simply start the game, turn it off without making any progress and then start it again, the game re-randoms if you have textboxes or not. Two players in the group with textboxes were players who started the game, couldn’t figure out how to do anything at all, restarted the game and was then given textboxes, and they both called me about it wondering if something was wrong with the game as these textboxes weren’t there from the beginning. In total you could say that this counts for 2 more players in the group without textboxes, but that neither of them made any progress what so ever.

The two people in the group without textboxes who didn’t complete the game couldn’t figure out the controls either, and they simply shut down the game and answered the survey. These two playtesters weigh down the performance of the “without textboxes”-group quite a bit, but despite this the group with
no textboxes still has a higher completion rate than the group with textboxes.

If a third group of players is constructed, consisting of “Those without textboxes that figured out the controls by themselves”, they have a 100% completion rate. They also have a gameplay grade of 9 and an overall grade of 8.5, both a lot higher than from the other groups.

When asked why players stopped playing the game, only one person replied that the game was too difficult. This was one of the two who couldn’t figure out the controls. Of all the 4 players with textboxes who didn’t complete the game, none of them didn’t because they thought it was too difficult: They either didn’t have time or they didn’t want to keep playing.

**Conclusion and Discussion**

It is evident that none of these solutions are optimal, the pattern that less text makes a better game does not hold true. If you count the two players who initially had no textboxes, restarted the game and then got textboxes, 67% of all players who played without textboxes were not able to make any progress whatsoever. In other words, there simply has to be an explanation of the controls at the start of a game. It’s possible that the reason that no explanation of controls worked on the old console games was because there were so few buttons on an NES controller, the controller used for input for these games:

![Nintendo NES Controller](image)

The players didn’t have much to chose from, meaning that brute forcing your way to knowledge was feasible. When the input device is a whole keyboard, it is not. For games on computers, there has to be something teaching the player which keys are relevant, otherwise most players are bound to just stop.

Apart from the textboxes that taught the player the controls, there was no positive feedback whatsoever. As said, one player called and refused to keep playing before they were taught how to remove them. The rating was lowered by the presence of textboxes, which directly corresponds to how the user rating was affected by this kind of text between The Legend of Zelda: Skyward Sword and The Legend of Zelda: A Link Between Worlds. The completion rate is also higher for the group that had no
textboxes, and those who figured out the controls despite the lack of instructions had a 100% completion rate of the game, corresponding to all students in a class passing the final exam.

With the small sample size of 12 players, consisting of people I know and therefore people more likely to be interested in games and have previous experience, backed up only by a few calls from friends, this study cannot present anything more than an indication. But it does, the outcome is in line with other studies in the same area. Also, the study from the Department of Computer Science & Engineering at the University of Washington only tested return rate and progress, this study is also indicating that the will to experiment is harmed by the explanatory text: The group of “those with no textboxes who figured out the controls” took more HP-items, suggesting that they had a higher will to experiment. The textboxes said nothing about the HP-items, but they still ruined the players will to experiment.

This will to experiment is generally rated highly in most swedish degree-systems, and to see that the textboxes affect it negatively is an interesting result, if not the most important one. It is through experiments that not only an individual, but mankind as a whole, has the potential to learn new things. To see that this drive is ruined by over-explaining is an even greater effect than the hypothesis stated, and indeed underlines that there is something interesting about pedagogy in this line of research.

From what the government decides and from the upswing in the market of extra teachers it seems that most of the swedish population think that the remedy for the swedish school is to explain further to the students. This study and other research is pointing towards this exact action as a problem rather than a solution, that explaining further to students about something that they have already been told is not helping at all, it is hurting their ability to learn about the subject. This should at least be an indication that there is something interesting in this direction of research, and that a re-visit on the strategy to stop the swedish school-results from dropping would be a good idea.

Further study

Testing to structuring lessons the same way videogames are structured for teaching would be an interesting next step. As an example, you could design an app that teaches the user about the quadratic formula. First off, the student is taught “the controls”, which would be “This is how the quadratic formula looks, this is how it is used”. Once this is done, the user completes a few quadratic formulas with these instructions still visible, like the first room in the game. When the player has completed a few, say maybe 3-4 of these, the player is shown what the final question looks like. The user is allowed to attempt this question, but after three failed answers the question is removed and it’s back to basics, without the instructions this time. This is now the tutorial part, where the player solves many quadratic formulas. As the player keeps solving them, a spree is recorded. As this spree is increased, the difficulty of the functions increase, which would correspond to making progress in a game. If the students gives an incorrect answer to an equation, the spree is reduced. This would correspond to taking damage. After a certain spree is reached, the player is once again given one of these “goal-equations”, which is equivalent to facing the final boss. If the student succeeds the player is considered to have learned about the quadratic formula. As this formula already works so well for teaching games, and all the top rated games use this formula to teach, it might work for teaching other subjects as well.
Summary

There is no reason to be so sure about what is problematic with the swedish school system. Before making the assumption that smaller classes and more help will increase the students performance, research on the subject should be carried out to find out what the problem really is. This study, along with the study from the Department of Computer Science & Engineering at the University of Washington, are pointing towards these actions being part of the problem rather than the solution. This study also suggest that over-explanation does not only decrease your ability to learn, but also hurts your will to experiment, and I think that this will is one of our most important feats as human beings. It would be better if there was more experimentation and less telling others what is right, these results indicate that this would lead to a happier and more effective school system with better results.
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