Game Design for Mobile Devices

A study on turn-based strategy games

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Abstract

In the last few years there has been an incredible rise in the amount of game applications available for the latest generation of mobile platforms. An increasing amount of developers and companies are starting to invest more heavily in producing for this growing market. This report investigates some of the challenges faced when developing these games, with the focus on the genre turn based strategy games. The main areas that are explored are the time of a session with the device, the touchscreen control, the hardware and graphics, and finally the user interface.

To accomplish this, three methods were used: creating a survey, testing successful game titles within the genre, and investigating various sources on the internet.

The findings suggest that rounds should be possible to complete in considerably less time than a minute. Also, people seems to have no preference in the way a game is controlled as long as the controls fits the game well. In regards to graphics and hardware, it was shown that people do not see 3D graphics as a requirement and developers should not prioritize it over other aspects of the game. As for the user interface, amongst other conclusions, developers should aim to keep clickable items the same size across screen sizes instead of downscaling them for smaller devices.

Referat

De senaste åren har antalet spelapplikationer för den senaste generationen mobila platformar ökat dramatiskt. Ett växande antal utvecklare och företag har börjat satsa mer och mer på att producera material till denna uppåtgående marknad. Den här rapporten utforskar några av de utmaningar som man ställs inför när man utvecklar spel till den mobila marknaden, med fokus på genren turbaserade strategispel. De områden som utreds i detalj är tiden för en spelsession, kontroll med pekskärmen, hårdvara och grafik, samt användargränssnitt.

Tre metoder användes för att genomföra detta: skapa en enkät, testa inom genren framgångsrika spel, samt undersöka diverse källor på internet.

Resultaten pekar mot att rundor bör vara möjliga att avsluta inom en minut. Det verkar också som att användare inte har några preferenser när det gäller hur ett spel ska kontrolleras så länge som kontrollerna passar spelet. Angående grafik och hårdvara så svarade enkättagare att 3D grafik inte är ett krav, utvecklare bör därför inte prioritera 3D grafik över andra delar av spelet.
Utvecklare av användargränsnitt bör, bland annat, se till att clickbara ting på skärmen inte nerskalas på mindre skärmar utan håller en konsekvent storlek mellan olika skärmstorlekar.

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1. Introduction

In the last few years there has been an incredible rise in the amount of apps available for the latest generation of mobile platforms. The number is closing in on a million for the iOS alone [1]. It is only natural that game developers would follow this trend and start making games for these platforms. However, there are some differences between developing games for mobile platforms and the older PC and video game console systems. The nature of the mobility and features of the new devices offer previously seldom explored challenges to game developers. How do you work around people using smartphones on places [2] that normally won't allow for extensive periods of consecutive gaming? How do you deal with the often small displays that mobile devices offer? Is 3D graphics important to users in mobile games? How do you deal with controls in mobile games? We've chosen to take a more in-depth look at these questions as we endeavour to find conclusions on how to design a turn-based strategy game for mobile devices.

1.1 Statement of Collaboration

Most parts of the project was done by both authors working together.
We discussed and came up with what questions to ask in survey, and which particular details we would examine when testing games. We then proceeded to individually study each of the games on our own, and afterwards compiling and discussing our conclusions. When writing up the report based on our notes, we initially divided the parts between the two of us, but after a first draft was established both authors went through the report and discussed the contents of each section and, jointly, made modifications if needed.

2. Problem Statement

There are several challenges when developing games for mobile devices. We have chosen to focus on four areas; time constraints, touchscreen, hardware and the user interface, also known as UI. These areas are explained more thoroughly in sections 2.1 to 2.5.

2.1 Time constraints

In recent years, people have started bringing their mobile devices with them everywhere they go. Most days they frequently pick it up to kill some time - be it on a bus ride or if they are just waiting for something [2]. This means that even if the number of sessions for a day can be large, the duration of each individual session is often rather limited. One wants to both be able to instantly start and stop using the device. This means that the conditions for games on a mobile device differ from games on traditional platforms, on which the gaming sessions are considerably longer.

What does this mean for our main focus, strategy games? Early speculation resulted in us choosing to narrow our research to turn based strategy games. We believe that due to the above mentioned time constraints on gaming sessions, the alternative, real time strategy games, would be considerably less optimal. The flexibility of being able to pick up the device, play a single turn, and then later on in the day when you have time, play your next turn, is something we find very interesting.

2.2 Touchscreen

The conditions for controlling games on a mobile device are vastly different from other platforms. On the PC you have a keyboard and mouse, and on gaming consoles you have controllers with joysticks and buttons. On modern phones and tablets, control is for the most part handled with a touchscreen. The majority of recent models have a so called multi-touch screen which allows for tracking of multiple touch motions simultaneously.

Each of these types of controls have different benefits and limitations. With the mouse of a PC you get unparallelled precise control and the

keyboard has a very large amount of buttons, which provides the ability to bind many different actions to keys. The joysticks of a console controller replaces the PC mouse, and the limited amount of buttons replaces the keyboard.

The touchscreen has no full replacement for the PC mouse cursor. You can use your fingers to perform the click action, but you lose the ability to "hover" the cursor. A problem with clicking using your fingers is that they are not see-through, and therefore obstruct your vision of the screen. Combined with the fact that the size of your finger is considerably larger than a mouse cursor, this naturally means that your precision is not going to be great.

However there are also exciting new possibilities with the touchscreen. The user can get more immersed in the game, given the fact that there is nothing separating the user from the content. The user physically touches everything, be it standard buttons or the objects of the game world, such as weapons or enemies. If done right, this could lead to an extremely intuitive control.

If the screen supports multi-touch, even more possibilities present themselves. The user can now use multiple fingers at once. Things like pinching two fingers to zoom in on a map, slide three fingers in a direction to rotate it, and pushing four fingers to exit the map view is now possible.

2.3 Hardware

Although mobile devices are rapidly gaining more computing power and memory they are still considerably slower than PC and gaming consoles. There are also a vast amount of different models of devices within the mobile market, most of whom are not equal in power. We will investigate how a developer could cater to most or all of these models. The focus will be on graphics as that is the most hardware demanding feature. A key question to be answered is, if a mobile game is fun, engaging and approachable, how important is advanced 3D graphics to the user?

2.4 UI - The user interface

Games for consoles and personal computers tend to have a lot of information available at the screen at any time. This is especially true for strategy games. These kinds of games often require the player to keep track of and control sometimes hundreds or thousands [3] of different units and, in many cases, at the same time build a flourishing economy to support the players troops. This often means that there is a mini-map and counters of several in-game resources, as well as other information, visible at all times in the user interface of the games. All to help the player with his tasks and decision making. Console and PC-games can support all this information because it is assumed that the player have a display that is big enough to show all this information without cluttering on the screen and at the same time having it clearly readable. Mobile devices does not have this luxury and developers need to adapt accordingly.

3. Related work

There does not seem to be any widely available scientific studies about the same specific topic as this essay. This is completely understandable studies often takes a more in-depth look at a more specific problem, such as User Interfaces, not several subjects at once. Following below are some studies that we like to highlight as we find them, perhaps not fully but, somewhat related to our problem areas.

Toumas Hynninen at the University of Tampere wrote a thesis [4] about touchscreen controls in first-person shooter games. In his thesis Hynninen takes a similar, although more in depth, approach on the specified subject as this essay strives towards. He analyzes three games for the iPod Touch and develops new heuristics for measuring the effectiveness of different control systems.

The Digital News Test Kitchen from University of Colorado Boulder conducted a survey[2] on college students behaviors and preferences in smartphone usage. The main focus was on how they consumed news media, but one can learn about general smartphone usage in it as well. The questions range from how and when they use their devices to how much information they typically prefer to take in at once. The results of the survey can be useful when developing any kind of mobile application.

4. Approach

4.1 Methods and motivation for them

As ways to gain a deeper understanding of designing games for mobile devices, we decided to use three methods.

First, we decided to create a survey which would be distributed through social medias to collect data. This data would help us understand how people use their devices and what they think about certain areas which are present in modern games and also the subjects in section 2. Areas would include device usage time, device movement, graphics, GPS usage in games, leveling systems and more. A survey would also be a very useful source of first-hand information from the potential player base and it would help us root out or preconceived notions of what people like.

We will also examine how developers of successful mobile games have handled our problems. We will do this by testing some games currently on the market. The topics listed in section 2. Problem Statement will be the main focus. Four mobile games and one PC game will be chosen by popularity and acclaim, as well as diversity in gameplay. The PC game is in the study to allow us to gain perspective on the differences between developing for PC and mobile devices.

Furthermore, there are some useful papers and articles done on subjects which are encompassed by our problem areas. We will look at their conclusions and use them to complement our own.

4.2 Execution

4.2.1 Collecting data

See Appendix A for the survey we created and distributed.
Following below are the papers and studies we're going to look at for each of our problem areas. Hardware and Touchscreen areas are left out because we couldn't find any suitable articles or papers.

For time constraints:
[2] A Survey by the Digital News Test Kitchen from University of Colorado Boulder, supplying empirical data on how, when and where people use smartphones.

For UI:
[5] An article by Brian Rieger on designing UI's for different sizes of screens.
[6] A series of advice by mobile consultant Jonathan stark

4.2.2 Testing games

Four mobile based games and one PC based game were chosen for testing. They were chosen by general popularity and acclaim as well as diversity in gameplay. Following below are a list of the chosen games.

4.2.2.1 UniWar HD

UniWar [7] is a game for iOS and Android devices where players battle it out on the field with armies consisting of different units, building bases and utilizing the terrain to gain victory. It is very popular, with over a half a million registered players [7] and it has received and positive reviews from users and professional critics alike [8].

4.2.2.2 Great Big War Game

The number one turn based strategy game on Google Play [9], Great Big War Game [10], is also about controlling armies and bases. It has been deemed "Strategy Game of the Year" by IGN in 2012. With a 3D environment, more detailed animations and unit models, it makes for a different gameplay, and should also be more hardware demanding, than UniWar for example.

4.2.2.3 Hero Academy

With a simple square, almost chess-like, playing field, Hero Academy [11] is a highly accessible strategy game for the iOS. It can boast with being "Mobile Game of the Year" winner at the 2013 D.I.C.E Awards, as well as being featured in Apple App Store's "Best of 2012" and nominated for "Best Mobile Game" at the 2013 Game Developers Choice Awards [12].

4.2.2.4 Neuroshima Hex

Neuroshima Hex [13] is a fast paced, tactical board game for mobile devices. It has high ratings from thousands of users and has won the award for "iOS Game of the Year" at Game Shark [14]. Given that it is a board game, it is bound to be quite different from our other selections, and most popular strategy games in general.

4.2.2.5 Civilization V

Civilization V [15] is latest installation of the series of grand-scale games that allows the player to build and advance a civilization from the stone age to far into the future. The game is part of the 4X genre (eXplore, eXpand, eXploit, eXterminate). It is one of the most popular and highly regarded turn-based strategy games ever [16].

5. Results

5.1 Result of survey

A total of 70 people answered the survey. Perhaps a low number, although still giving useful insight since the people who answered are very likely to be amongst the demographic this game is aiming for. The survey was distributed on Facebook, Twitter and TeamLiquid.net which is a fansite for popular strategy games such as Starcraft: Brood War, Starcraft II and DOTA 2. We chose those areas to get a good spread of responses, from normal smartphone users on social media, to the more strategy game experienced gamers of TeamLiquid. Below follows some results from the survey and a complete list of results from the survey can be seen in Appendix B.

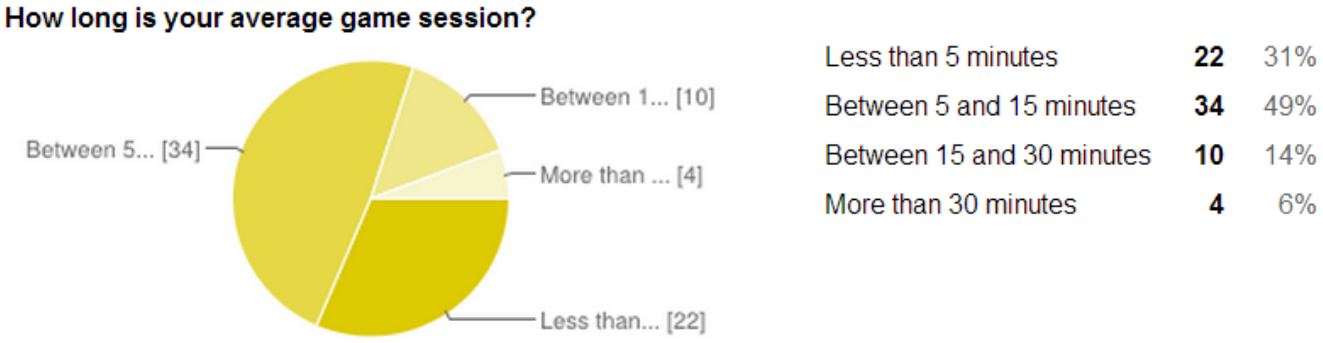

Fig. 5.1.1.

A vast majority (80%) answered that the amount of consecutive time playing is below 15 minutes on average whilst 14% answered that they play between 15 and 30 minutes on average. Only 4 people (6%) answered that they play more than 30 minutes each session.

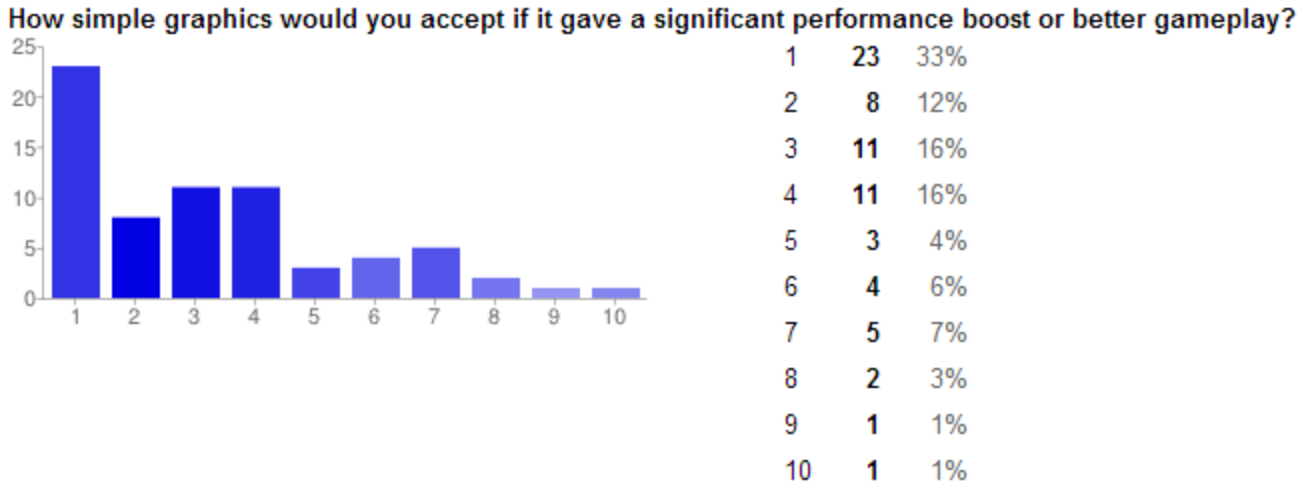

Fig. 5.1.2. Where a 1 means accepting very simple 2D graphics, and a 10 means the graphics being state of the art.

It is apparent that gameplay is the number one priority for mobile gamers. The vast majority chose a value representing graphics being of less importance and as many as 33% chose to accept the simplest forms of graphics if it meant the game being smoother with improved gameplay.

Fig. 5.1.3. A 1 means "As simple as possible" and a 5 means "Fully fleshed out with possibilities to control almost everything".

From the above graph we can clearly see that people prefer low to moderate amounts of options and information in a user interface for a mobile game. Only a total of 8% said they wanted more complex types of user interfaces.

Fig. 5.1.4. Where 1 is "I only want to use one hand" and 5 is "I like using both hands".
This figure shows that people most people are either indifferent or open to the idea of using both hands for control.

5.2 Result of game testing

Following be are some of the results for each game.

5.2.1 UniWar HD

Fig. 5.2.1.1, Screenshot of UniWar HD.

Time constraints:

A round in UniWar HD usually takes less than a minute to complete although it could take considerably longer due to the amount of thought put into positioning units. A match usually takes around 15-20 minutes.

Touchscreen:

The controls of this game are simple and intuitive. Clicks with a finger selects a unit or base and a swiping motion will scroll the screen towards a different part of the map.

Hardware:
UniWar is a game for Android and iOS systems. As can be seen in Fig. 5.2.1.1 it has very simple 2D graphics and the mapsize is usually small (less than 32x32 tiles). This game runs very smooth even on a 3 year old device (Sony Ericsson XPERIA Mini).

UI:
It works best with bigger screen sizes as it becomes difficult to place units on tiles with screen sizes around 2 inches. This is because of the small size of the tiles compared to the players fingers which would cover several tiles and cause miss clicks.

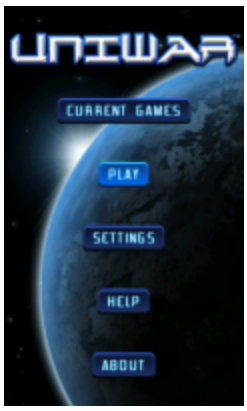

Fig. 5.2.1.2, Screenshot of UniWar HD menu screen.

The UI is extremely simple. The menu options are as bare as it can get and, as seen in Fig. 5.2.1.1, the in-match interface only displays the amounts of credits the player has in addition to the map and four buttons. The buttons represent the "information screen", the "chat window", the "end-turn" button and the "open menu" button. This specific part of the UI is well suited for small screens.

5.2.2 Great Big War Game

Fig. 5.2.2.1, Screenshot of Great Big War Game.

Time constraints:
During one turn a player gets to move and perform actions with each of their units. They can also create new units in their base structures. So the length of a turn is very much dependant on how many units the player have and how much money he has gathered to create new ones. Naturally this means that in the early stages of a match the turns will go very fast, normally a couple of seconds, and as the game goes on and the players massing up larger and larger armies, the turn time will increase as well and can become longer than a minute. The total time spent by one player in a whole match can be anything from 10 to over 30 minutes.

Touchscreen:
To control the different units you can click on them to select them, and green circles as seen in Fig. 5.2.2.1 will show you where that unit can be moved to, once you click one of them the unit animation will start and the unit will relocate. It does utilizes more advanced touch screen gestures than just clicking through. You can drag your finger anywhere on the ground and it will scroll the camera how you would expect it. You can also pinch two fingers to zoom in and out. Navigating the battlefield becomes very intuitive and smooth, and you get a good overview of the map as well as detailed close ups, whenever you so choose.

Fig. 5.2.2.2, Demonstrating the zoom feature in Great Big War Game.

Hardware:

Great Big War Game has put a lot of effort into graphics. It is played on large and varied maps populated with 3D models of units, structures and plants. This naturally puts some demands on the hardware, but a four year old iPhone 3Gs runs it and the animations are perfectly smooth, so it is clearly not programmed solely for the latest state of the art devices.

UI:

The UI is consistent throughout all the menus of the game. Whether the user is creating a new account or creating new soldiers from the barracks in a match as seen in Fig. 5.2.2.3, everything is familiar and intuitive.

Fig. 5.2.2.3, The UI of Great Big War Game. This screen is you creating new units from a structure.

5.2.3 Hero Academy

Fig. 5.2.3.1, Screenshot of Hero Academy.

Time constraints:

In one turn the user gets to perform 5 actions. One action can be moving a unit a couple of squares, performing an attack, using an item, amongst other things. This keeps the turn short and consistent. One turn usually takes between 20 seconds and a minute to complete. There is no set timer though, so the user is free to strategize and plot as much as he or she pleases. A match usually takes around 10 to 20 minutes to complete in total.

Touchscreen:
Due to the nature of the touchscreen, especially if the screen is small, misclicks are bound to occur. Fortunately, the user can at any time undo actions by a press of a button. The user himself can choose when to submit his actions. This also allows for trying out different tactics and trying to find the optimal path for this specific turn. This makes the game very flexible. If a user only wants to quickly play his turn in a couple of seconds he can do that. If he on the other want to spend more time than that, there is room for deep strategizing and optimization.

Hardware:
Hero Academy is played on a 5 x 9 square playing field. The graphics are 2D, in a cartoon-like style. This leads to consistent, approachable gameplay, and the user always have an overview of everything.

UI:
There is not much to say about the user interface. The menus have no superfluous buttons or text, and are intuitive to navigate. The simplicity of the gameplay helps keeping the number of buttons and text during matches to a minimum.

5.2.4 Neuroshima Hex

Fig. 5.2.3.1, Screenshot of Neuroshima Hex

Time constraints:
A players turn consist of the player drawing three cards from his deck, and then placing two of them on the field while discarding the last card. That means one turn can be done in very little time. However if the player is unfamiliar with some of the cards he will most likely need to read about their abilities. Combined with time to think about tactics, this means that the length of a turn can vary a lot. Anything from a couple of seconds to a minute is normal. It usually takes 10 to 15 minutes in total to complete one match.

Touchscreen:
The game utilizes the touch screen to create an intuitive control system. Cards are dragged from the hand the board, and can then be rotated by making a natural circular motion with your finger around it.

Hardware:
The graphics are very simple, even for a boardgame. The users always sees the 2D playing field from straight above, so there is no attempt to make it seem like a 3D game using a camera angle. Only the very simplest of animations, like cards shaking, exist.

UI:
The user interface during gameplay is minimalistic, and scalable to smaller screens, with buttons only being in the corners of the screen. The menu system is also flexible with items only being as large as they need to be, and there are not more things on the screen than what is required.

5.2.5 Civilization V

Fig. 5.2.5.1, Screenshot of Civilization V.

Time constraints:
Each round usually takes between under a minute and 5 minutes to complete depending on how far the game has progressed. The average game length seems to lie somewhere in the 5 to 10 hour range unless the player is extremely unlucky or inexperienced.

Touchscreen:
The game is primarily controlled with the mouse and it is not needed to use the keyboard to achieve efficient play. This could easily be transferred to touchscreens.

Hardware:
The game has a very grand scale both in time and in size. It can support up to 16 players and huge maps (up to 362x362 tiles). The game has 3D graphics which looks very good on the highest settings. However running this game on these settings might result in a significant performance hit on the larger maps as the game struggles to compute every single detail.

Fig. 5.2.5.2, Screenshot of Civilization V Setup game menu.

UI:

The UI feels intuitive, although it is fleshed out with many options in the menu, with clearly labeled buttons. It often provides additional information if the mouse cursor is hovering above a button or information pane. The game follows the standard UI style of the real-time strategy genre which includes a minimap (Fig. 5.2.5.1 bottom-right corner) and an information pane that displays the capabilities of the currently selected unit (Fig. 5.2.5.1 bottom-left). It also keeps the players resources available at the top left of the screen at all times. All this information would most likely either clutter the screen or be almost invisible if it was to be played on a small screen (smartphone).

6. Analysis and Conclusions

6.1 Analysis of results

6.1.1 Time constraints:

Survey:
The two most popular responses to the question "How long is your average game session?" was "between 5 and 15 minutes" (49%) and "less than 5 minutes" (31%), see Fig. 5.1.1. In that amount of time, the user must start up the application, find the match he wants to play a turn in, get an overview of the state of the game, and then actually figure out which moves to make. This means that a turn must not be too complicated or take too long. Perhaps a user has several matches going at once, and wants to play a turn in several of them during the same game session. However if the user wants to focus on a single match, the game should be deep enough for advanced strategies to be possible and useful.

Game Testing:
Each of the mobile games has turns which generally take less than a minute to complete, most of the time they appear to be possible to complete in less than half a minute even. In the PC game Civilization V however, a turn usually takes considerably longer, up to around 5 minutes. That is only logical, as peoples game sessions at the computer is almost always considerably longer than that of the mobile devices.

The total time for matches on the mobile games roughly range from 10 to 30 minutes. As we found out above from the survey, that is longer than the average mobile gaming session. Users are therefore rarely going to be able to play an entire game at the same time, even if the opponent executes his turns quickly. This means the turns must be short, while still being satisfying enough so that playing only one or a couple of them each gaming session feel meaningful.

Sources:
The survey[2] by Digital Test Kitchen, regarding smartphone usage amongst young adults, reveals interesting information on this subject. They found that, on a regular basis, 93% uses the smartphone while riding a bus, train, or car; 92% use it during idle time at work or school; 85% use

it while waiting in line (grocery store, coffee shop checkout etc). All of the above, most of the time, means that you have a short period of time you want to pass while waiting for something. It stands to reason that people then wants to be able to quickly start an app and get to some worthwhile content, and being able to abruptly stop using it as well. In the context of turn based strategy games, this means that it should be easy and fast when entering the application to get into the matches and playing turns.

They also discovered that, when consuming news, the average person reads 3 paragraphs or less of an article, listens to less than 30 seconds of an audio report, and watches less than 1 minute of a video report. This shows the low patience and attention span people often have when using smartphones. One can use this data to make turns can be completed quickly, in 1 minute or preferably considerably less than that.

6.1.2 Touchscreen:

Survey:

The survey only briefly touched on this subject, as it would be hard asking complex control questions to everyday smartphone users. It had a related question - "How do you feel about playing with two hands?". As seen in Fig. 5.1.4 and Appendix B, most people seemed positive or neutral to the idea of using both hands. This could mean either, just that, or that people are open to new ideas of control in general. It could also mean that it depends on what game they're playing. Some games could work very well with two hands. This is very hard to interpret.
The conclusion we draw from this is that people will accept a control scheme if it fits the game, people don't seem to have preconceived notions of how controls should be.

Game testing:

All games have very simple and intuitive controls. The PC games are primarily mouse controlled while using the keyboard is optional. The mobile games were all very easy to control as well. Neuroshima Hex have a nice control feature which allows the player to rotate a card with his fingers. Great Big War Game used multi touch features to control the point of view, such as pinch two fingers to zoom in on the world.

The only problem with the controls seems to be in the cases of, for example, UniWar where there is potential for miss clicking when units or

tiles are small compared to the player's finger. UniWar, Great Big War Game and Hero Academy all had "Undo"-functions to combat this problem. While such a function is effective, it would be better to remove to problem altogether by making tiles and units bigger on the screen. The drawback of such a change would be slightly more scrolling of the game screen since the game would effectively be more zoomed in.

6.1.3 Hardware:

Survey:
As seen in Fig. 5.1.2 it is clear that people are willing to sacrifice good looks in a game if it means improvements for other aspects of the game such as gameplay or performance. The conclusions that can be drawn from this is that gameplay and performance should always be prioritized over good looking graphics.

Game testing:
All of the games ran very smoothly with the exception of Civilization V. This game had a substantially larger scale than the rest as well as more complex graphics and a lot of information available at the screen. The rest of the games are a lot simpler in all aspects. A complex game such Civilization V finds its niche on PC because of the wide power range of computers, some of them are powerful enough to run the most complex scenarios in the game. Mobile devices simply are not.

Even though the other mobile games are less complex than Great Big War Game, which both have 3D graphics and complex gameplay (still substantially less than Civilization V), they have proven that 2D graphics and simpler gameplay can still yield very successful mobile games, at least in the genre of strategy games. The conclusion is, if there is any doubt that the game is too complex, 2D graphics might be a good choice.

6.1.4 UI:

Survey:
In Fig. 5.1.3 we discovered that most people want a complete balance between simplicity and the ability to control everything when it comes to the user interface. Only a small minority (8%) was leaning more towards complexity and all of them used devices with relatively large screens. Almost half the answers (42%) was leaning more towards simplicity. The

conclusion to draw here is that, on their mobile devices, the priority is not to offer control of every little thing, and rather aiming for a simple UI working on all screen sizes. However, it is important to not dumb it down too much, and keep some amount of detail as most of the answers wanted a compromise.

Game testing:
The user interface of Civilization V, shows a lot of details at all times,but that only works on the larger screens of the PC, and would not be possible to use on a smartphone. The mobile games has instead opted for as minimalistic UI:s as possible, to be able to work well on a variety of different screen sizes. No superfluous buttons or information is presented at any one time.

Sources:
Stark [6] has some valuable insight on UI design. He argues that the most common source of input on a touchscreen is the thumb. Any item that needs interaction with should be designed to be around 44 pixels in size (the rule-of-thumb as Stark describes it) due to the size of the average thumb.
Rieger [5] argues that UI should be designed by dividing screen sizes into groups and design a special case of a base design for each group. This is to prevent the cluttering that could happen when a UI designed for bigger screens gets crammed into a smaller screen The smallest group of screen sizes should have the least amount of information shown on the screen while more and more information should be available as screens grow bigger in size.

6.2 Game design conclusions

When designing a turn based strategy game for mobile devices, all evidence points towards short and flexible turns being the best choice. More concretely, they should on average take considerably shorter than one minute to complete, given what we learned from [2] and the game testing. By flexible turns we mean that the strategy element of the gameplay shall both allow for turns completed in a matter of seconds, and for it to be rewarding spending more time, if the user has it, planning moves and coming up with tactics.

When it comes to control, the standard for this type of game is to keep it simple. Clicking to select the units, and clicking where to move them, etc. Some touch screen gestures, such as pinch-to-zoom level, and dragging a finger to scroll around the map, works great and feels very intuitive. Our survey, see Appendix B and Fig. 5.1.4. revealed that most people are neutral when it comes to the choice of using one or two hands to play. So if developers are free to choose whether or not they want to implement it. The survey pointed towards no big opinion in either direction.

Due to controlling with fingers, which are both opaque and large in relation to the device, clicking on something you did not intend happens regularly. In strategy games performing a bad move can be fatal for the outcome of the match. Some of the games have a small, but very effective, feature to combat this: an undo button. For this type of games, we strongly recommend adding this.

When it comes to deciding the graphical style of the game, three of the games proved that you can be very successful with using simple 2D graphics. The priority should be on creating a game that is approachable and with solid gameplay, and not on advanced 3D graphics. This is clearly supported by our survey (see Appendix B), as seen especially clearly in Fig. 5.1.2. A large additional benefit is that a lot more of the devices with weaker hardware are able to run the game.

Designing the user interface for mobile games is a balancing act. In Fig. 5.1.3 our survey asks the question of whether people prefer simplicity or ability to complete control. The most popular choice was to have something in between, with almost as many leaning more towards simplicity, while very few responders prefered the other direction. The games tested seemed to have a rule of thumb of keeping buttons and text to a bare minimum, opting to show no superfluous elements. However they still managed to not leave out any function that was expected to be there. Another important thing to keep in mind is that keeping the UI as clean and simple as possible makes it very flexible when it comes to different screen sizes. When possible, developers should aim to make clickable items the same size across all screen sizes instead of downscaling them on small devices. This is to prevent miss clicks.

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8. Appendix

A. Survey

Long link:
https://docs.google.com/forms/d/1632SWFZDbeWm48dgRwrCMgphbTC-6Ym82WomsqFYe64/viewform

Mobile Multiplayer Games

A short survey for a Bachelor thesis in Computer Science at the Royal Institute of Technology. The goal of the survey is to aid in developing a concept for a turn-based strategy game for mobile devices.

Which kind of mobile device(s) do you own/use?

- [ ] iPhone
- [ ] iPad
- [ ] Android Phone
- [ ] Android Tablet
- [ ] Other:

How old is your primary device?

If you chose multiple devices in the previous question, select the age of the device you use most frequently.

- ( ) Less than 1 year
- ( ) 1-2 years
- ( ) 3-4 years
- ( ) Other:

Roughly, how large is the screen of your primary device?

Give an estimate

- ( ) Smaller
- ( ) 3"-4" (iPhone)
- ( ) 4"-5" (Samsung Galaxy)
- ( ) 5-6" (Larger phone)
- ( ) Larger (Tablets)

How long is your average game session?
When you bring out your device for some gaming, how much time do you spend on it before you put it away again?

- ◯ Less than 5 minutes
- ◯ Between 5 and 15 minutes
- ◯ Between 15 and 30 minutes
- ◯ More than 30 minutes

How important is integration with social networks like facebook?
To find friends to play with.

	1	2	3	4	5	
"Find by username" is enough.	◯	◯	◯	◯	◯	A must have.

Is it important to know how well your friends fare in the game you play?
Example: Seeing your friends high scores on facebook

	1	2	3	4	5	
I hate it.	◯	◯	◯	◯	◯	A must have.

What do you think of a "Find Nearby Players" feature?
Using the device's GPS or Bluetooth features.

	1	2	3	4	5	
Terrible	◯	◯	◯	◯	◯	Very useful

What do you think of incorporating GPS location into a game?
Example1: Gaining high ground advantage in a strategy game if your position in real life is above the other players position. Example2: Simulating a battleground for two players based on the actual landscape between them.

	1	2	3	4	5	
Terrible	○	○	○	○	○	Very useful

What do you think of having device movement incorporated into a game?
Example: Tilting the device to turn in a racing game.

	1	2	3	4	5	
Terrible	○	○	○	○	○	Very useful

What do you think of having voice commands to perform actions in a game?

	1	2	3	4	5	
Terrible	○	○	○	○	○	Very Useful

What do you think of a standard points + highscore ranking system?
You collect points by playing, and there is a list of the highest scores.

	1	2	3	4	5	
Terrible.	○	○	○	○	○	Very good.

What do you think of a division/league tier based ranking system?
You are placed in the same league as those of similar skill, and can be demoted / promoted to higher/lower leagues.

	1	2	3	4	5	
Terrible.	◯	◯	◯	◯	◯	Very good.

Do you feel that a leveling/growth system offers valuable incentive to play more?

	1	2	3	4	5	
Not at all.	◯	◯	◯	◯	◯	It is very addicting.

What is the optimal number of players in a multiplayer strategy game?

- ◯ 2
- ◯ 3
- ◯ 4
- ◯ More

How important is it that the game is "cross-platform"?
So you can play against Android users if you are playng on an iPhone.

	1	2	3	4	5	
Not important.	◯	◯	◯	◯	◯	Vital.

Would you like to have the option to be able to play offline vs AI?
For fun and for training, against a computer controlled opponent.

	1	2	3	4	5	
Don't care.	◯	◯	◯	◯	◯	Very useful.

Is a simple or a complex game more fun on a mobile device?
Example: Tic-tac-toe vs Starcraft

	1	2	3	4	5	6	7	8	9	10	
Simple	○	○	○	○	○	○	○	○	○	○	Complex

How important is 3D-graphics in a mobile game?

	1	2	3	4	5	
Not important	○	○	○	○	○	Essential

How simple graphics would you accept if it gave a significant performance boost or better gameplay?

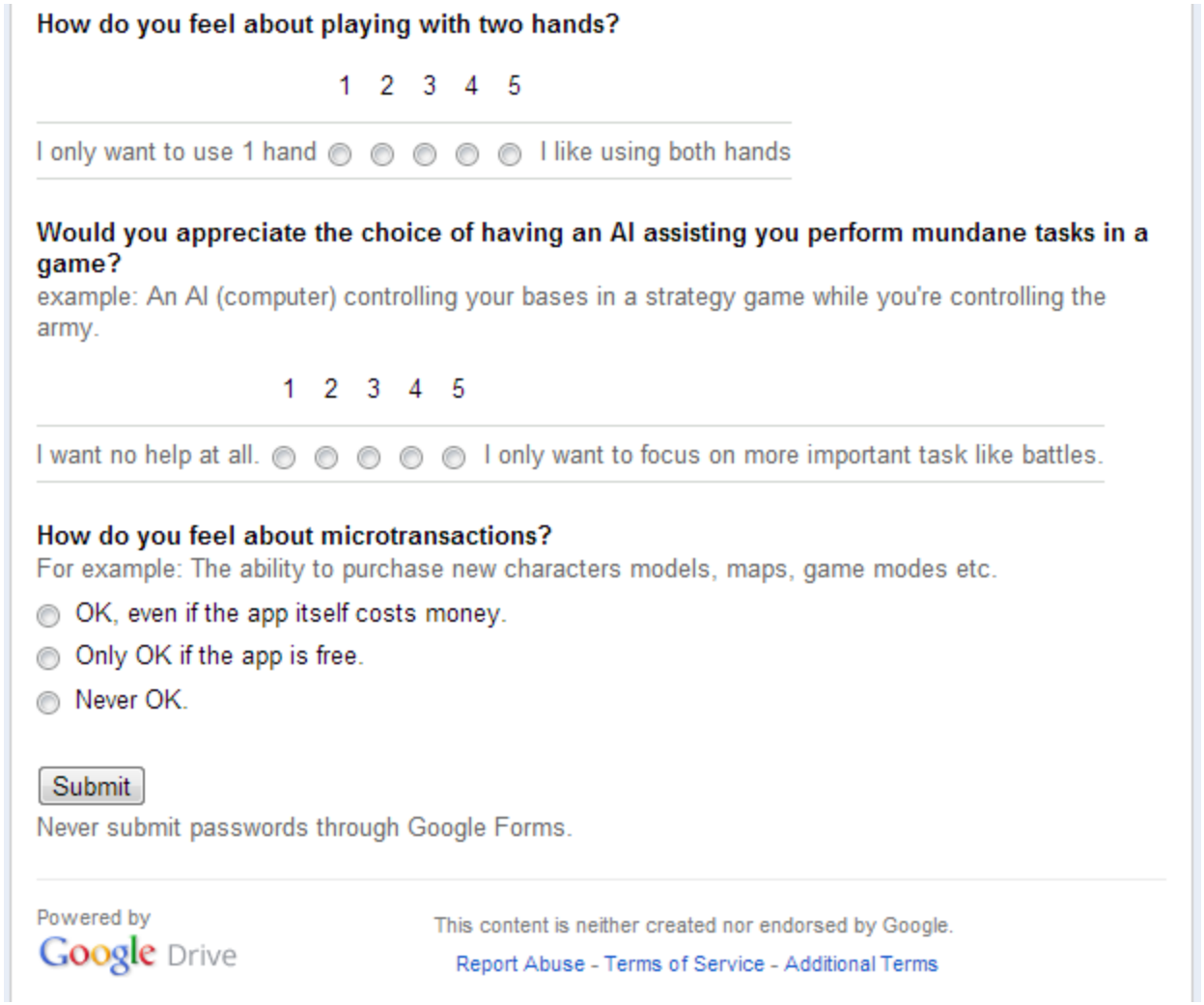
	1	2	3	4	5	6	7	8	9	10	
I would accept simple 2D graphics.	○	○	○	○	○	○	○	○	○	○	I only want state of the art graphics.

How complex of an user interface do you want?
For a mobile game.

	1	2	3	4	5	
As simple as possible.	○	○	○	○	○	Fully fleshed out with possibilities to control almost everything.

How do you feel about playing with two hands?

	1	2	3	4	5	
I only want to use 1 hand	○	○	○	○	○	I like using both hands



How do you feel about playing with two hands?

1 2 3 4 5

I only want to use 1 hand ○ ○ ○ ○ ○ I like using both hands

Would you appreciate the choice of having an AI assisting you perform mundane tasks in a game?

example: An AI (computer) controlling your bases in a strategy game while you're controlling the army.

1 2 3 4 5

I want no help at all. ○ ○ ○ ○ ○ I only want to focus on more important task like battles.

How do you feel about microtransactions?

For example: The ability to purchase new characters models, maps, game modes etc.

- ○ OK, even if the app itself costs money.
- ○ Only OK if the app is free.
- ○ Never OK.

Submit

Never submit passwords through Google Forms.

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Report Abuse - Terms of Service - Additional Terms

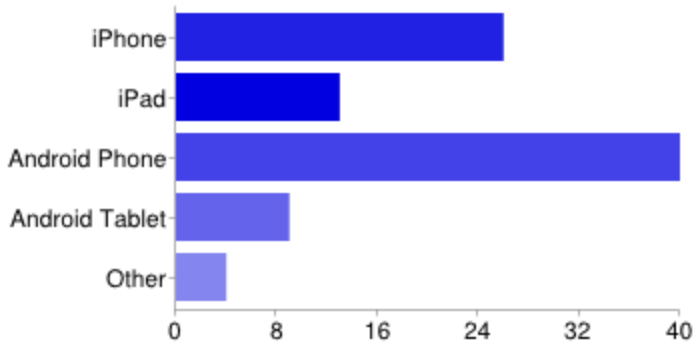
B. Result from survey

Long link:
https://docs.google.com/forms/d/1632SWFZDbeWm48dgRwrCMgphbTC-6Ym82WomsqFYe64/viewanalytics

70 responses

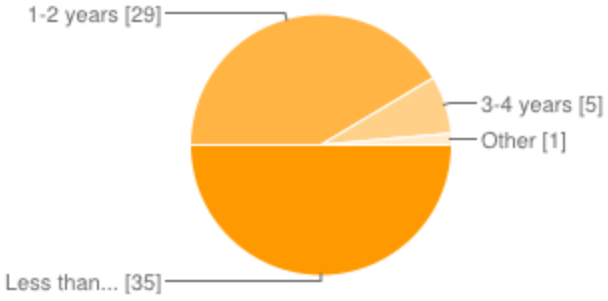
Summary See complete responses

Which kind of mobile device(s) do you own/use?



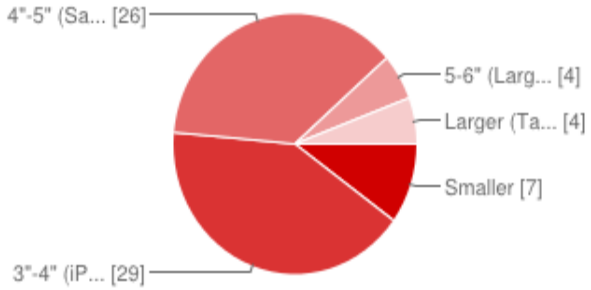
iPhone	26	28%
iPad	13	14%
Android Phone	40	43%
Android Tablet	9	10%
Other	4	4%

How old is your primary device?



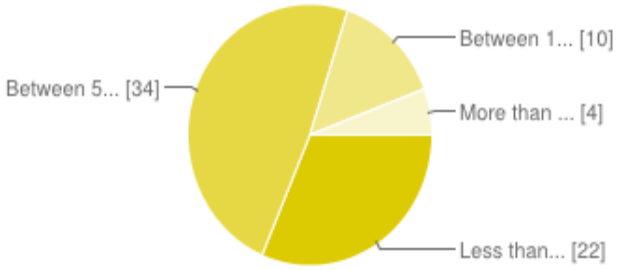
Less than 1 year	35	50%
1-2 years	29	41%
3-4 years	5	7%
Other	1	1%

Roughly, how large is the screen of your primary device?



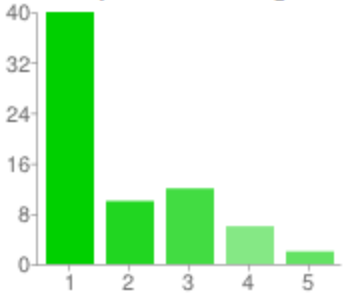
Smaller	7	10%
3"-4" (iPhone)	29	41%
4"-5" (Samsung Galaxy)	26	37%
5-6" (Larger phone)	4	6%
Larger (Tablets)	4	6%

How long is your average game session?



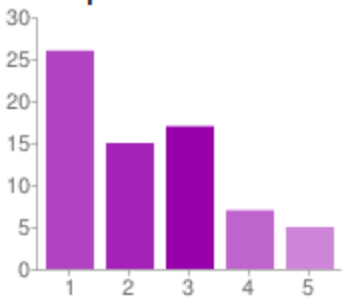
Less than 5 minutes	22	31%
Between 5 and 15 minutes	34	49%
Between 15 and 30 minutes	10	14%
More than 30 minutes	4	6%

How important is integration with social networks like facebook?



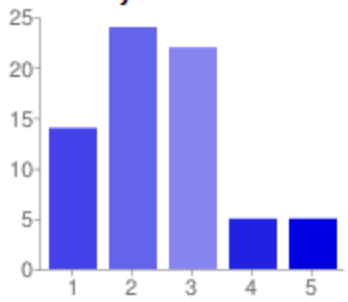
1	**40**	57%
2	**10**	14%
3	**12**	17%
4	**6**	9%
5	**2**	3%

Is it important to know how well your friends fare in the game you play?



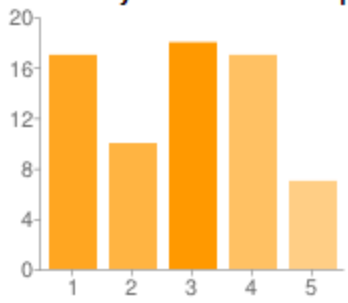
1	**26**	37%
2	**15**	21%
3	**17**	24%
4	**7**	10%
5	**5**	7%

What do you think of a "Find Nearby Players" feature?



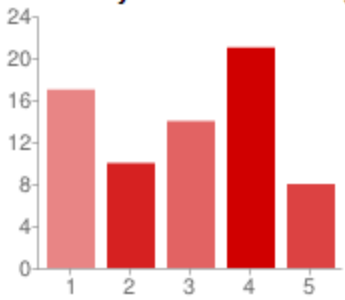
1	**14**	20%
2	**24**	34%
3	**22**	31%
4	**5**	7%
5	**5**	7%

What do you think of incorporating GPS location into a game?



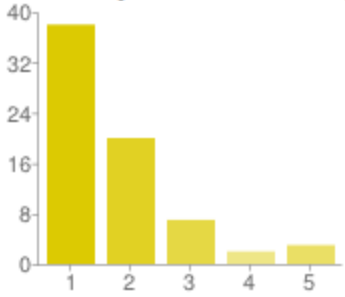
1	**17**	25%
2	**10**	14%
3	**18**	26%
4	**17**	25%
5	**7**	10%

What do you think of having device movement incorporated into a game?



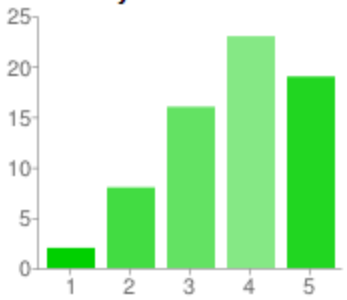
1	**17**	24%
2	**10**	14%
3	**14**	20%
4	**21**	30%
5	**8**	11%

What do you think of having voice commands to perform actions in a game?



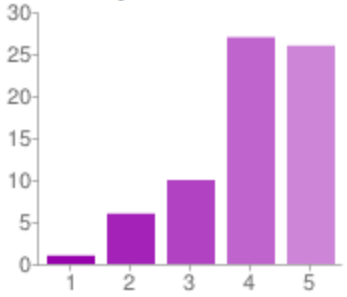
1	**38**	54%
2	**20**	29%
3	**7**	10%
4	**2**	3%
5	**3**	4%

What do you think of a standard points + highscore ranking system?



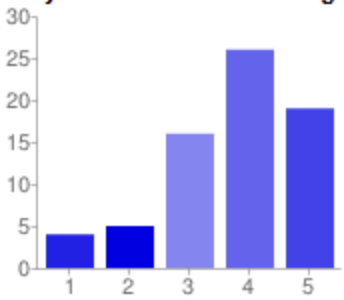
1	**2**	3%
2	**8**	12%
3	**16**	24%
4	**23**	34%
5	**19**	28%

What do you think of a division/league tier based ranking system?



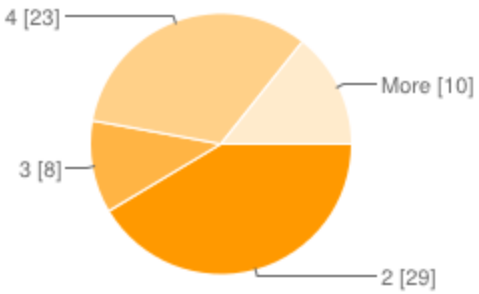
1	**1**	1%
2	**6**	9%
3	**10**	14%
4	**27**	39%
5	**26**	37%

Do you feel that a leveling/growth system offers valuable incentive to play more?



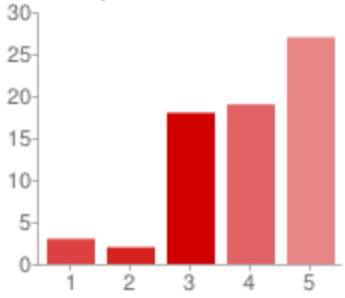
1	**4**	6%
2	**5**	7%
3	**16**	23%
4	**26**	37%
5	**19**	27%

What is the optimal number of players in a multiplayer strategy game?



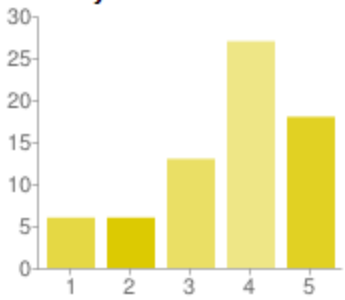
2	**29**	41%
3	**8**	11%
4	**23**	33%
More	**10**	14%

How important is it that the game is "cross-platform"?



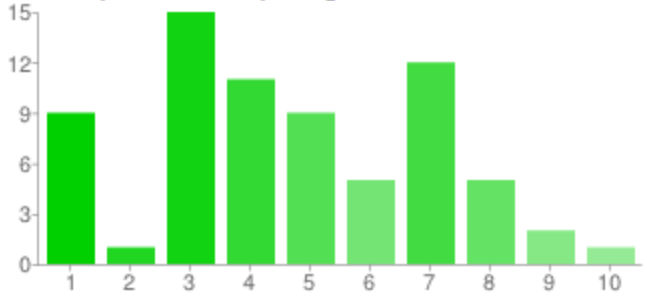
1	**3**	4%
2	**2**	3%
3	**18**	26%
4	**19**	28%
5	**27**	39%

Would you like to have the option to be able to play offline vs AI?



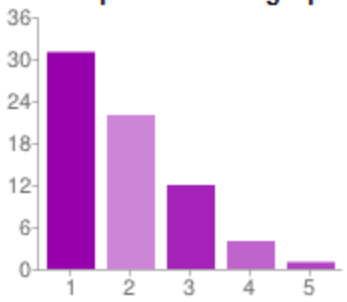
1	**6**	9%
2	**6**	9%
3	**13**	19%
4	**27**	39%
5	**18**	26%

Is a simple or a complex game more fun on a mobile device?



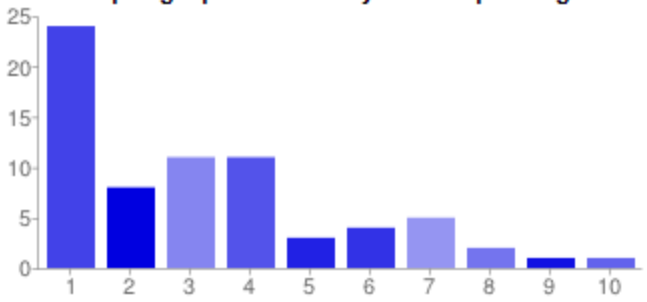
1	**9**	13%
2	**1**	1%
3	**15**	21%
4	**11**	16%
5	**9**	13%
6	**5**	7%
7	**12**	17%
8	**5**	7%
9	**2**	3%
10	**1**	1%

How important is 3D-graphics in a mobile game?



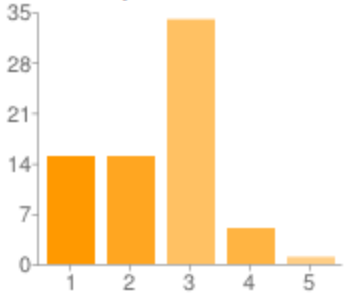
1	**31**	44%
2	**22**	31%
3	**12**	17%
4	**4**	6%
5	**1**	1%

How simple graphics would you accept if it gave a significant performance boost or better gameplay?



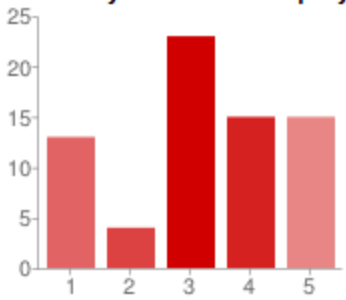
1	**24**	34%
2	**8**	11%
3	**11**	16%
4	**11**	16%
5	**3**	4%
6	**4**	6%
7	**5**	7%
8	**2**	3%
9	**1**	1%
10	**1**	1%

How complex of an user interface do you want?



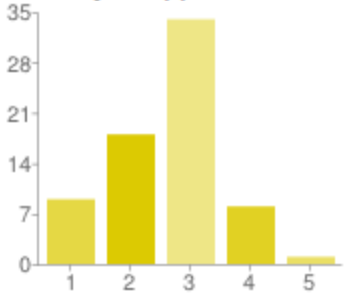
1	**15**	21%
2	**15**	21%
3	**34**	49%
4	**5**	7%
5	**1**	1%

How do you feel about playing with two hands?



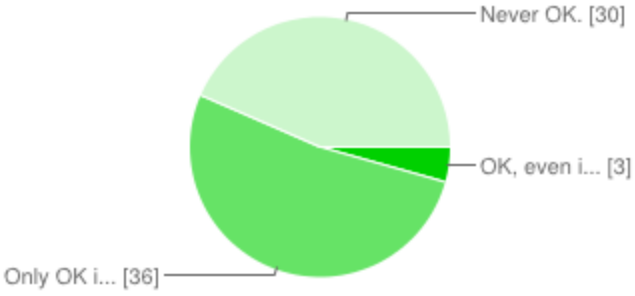
1	**13**	19%
2	**4**	6%
3	**23**	33%
4	**15**	21%
5	**15**	21%

Would you appreciate the choice of having an AI assisting you perform mundane tasks in a game?



1	**9**	13%
2	**18**	26%
3	**34**	49%
4	**8**	11%
5	**1**	1%

How do you feel about microtransactions?



OK, even if the app itself costs money.	**3**
Only OK if the app is free.	**36**
Never OK.	**30**