SQL in Steps focus group transcript

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The following is part of Appendix C of *"Easing access to relational databases"* PhD thesis. It contains a full transcript of a focus group conducted following the SQL in Steps study.

Researcher: Here are some statistics on how you used the thing (SiS) *[hands out individual statistic forms to all participants]*. I'm going to struggle to remember all your names. You all used it to varying different degrees and in different ways. I thought it might be kind of helpful for you to see what you actually did. So, I'm going to give you one of these as well. This is what I want you to busy yourself with while I'm going to get pizzas. I don't want you to write your names on these, these will all go down as *"someone in the focus group"*, the whole thing is anonymous.

[participants compare statistics]

Participant 6: *[in reference to the wording of the questionnaire] "In English"?!*

R: As in, in words, not in SQL.

[participants look over questionnaire]

[Researcher leaves the room]

P2: Does anyone else have a workshop for 120?

P4: How'd you guys do in the test *[for 120]*?

P1: It was alright actually, I think I did pretty good actually.

P2: I checked the marks, 80 percent.

P4: That's excellent!

P6: Thirty-two out of thirty six.

P2: Yeah, I think I got thirty-one.

[participants filling out questionnaires]

P3: What does COUNT do again?

P2: It counts!

[P3 and P6 laugh]

P4: See, it says designer in the designer table and the name is an integer.

P6: I don't think it's supposed to be.

P5: It's taken the design ID from the designs table so that's probably why.

P4: It should be a character or something, that's weird. Who knows, maybe its just barcode names!

[participants filling out questionnaires]

[P3 using previous questionnaire as guideline]

P3: Has anyone put an answer for question 5?

[No answers]

P1: I've totally forgotten everything.

[filling out questionnaires]

P2: What was the format for inputting dates again? I know its year month date but is it slashes in between?

P6: What?

P2: The format for inputting a DATETIME.

P5: It was day, month, year.

P2: It was year, month, day, I was just wondering what separates the year, the month and the day.

P4: Slash or dash. I think its dash.

P1: It changed didn't it. I swear there are two different ways. I don't know.

[no agreed answer found]

P3: Have you done SQL? *[referring to the coursework]*

P2: Yeah I have.

P1: Hasn't everyone done that?

P6: Yeah, I've done it.

P1: Do you mean you've done it and not had it marked yet?

P3: How'd you get on?

P6: I lost two points.

P1: Is that it?

P2: Yeah, I lost one point for explanations.

P6: If your queries work you're gonna get full marks.

P1: I just can't figure out that whatever it is question. If anyone wants to write down the right answer and pass it to me now...

P6: *[laughs]* Well it'll get caught on camera!

P1: *[laughs]*

P2: You can do more than or less than or more than or less than or equals to because one of the questions about the countries was greater than or equal to something like ten million people.

[filling out questionnaires]

[Researcher enters the room]

R: I've got some screenshots that you can all draw over about what you'd change and stuff. Let me start by talking you over the thinking behind it all. The idea was, because I've been a TA and I did it myself for ages. Trying to learn SQL with that black and white console can be a bit sort of ...

P3: Disorienting.

R: Did anyone else think that?

P4: What was that sorry?

R: Just the console, it was kind of the reason that I started trying to think about something to make it a bit easier because interacting with SQL straight through a console when you've got no hints or anything seems a bit daunting I suppose.

P1: Especially when you're coming from Microsoft Access or something.

R: Yeah, if you've done access before or something it can be a bit intimidating. So I guess that was the reason I started this.

P6: Like we did Scratch for 120.

R: Did you find that helped?

P1: No, it was awful.

P6: Not really.

P2: Scratch, I think Scratch just misled me a bit.

R: What was the transition like from Scratch to C?

P2: Daunting, overwhelming.

P6: I've done programming before, I knew how to program basically so it didn't help me I don't think.

R: So, you guys have been without SQL in Steps for two weeks now.

P1: *[jokes]* Which is when we could have used it the most!

R: How are you finding it without it? Because it was a concern I suppose is how you might fair once I take it away.

P2: I think by now, what we've been doing SQL for 5 weeks, it feels a lot more natural now, just having it in a console. Its a lot easier to visualise.

R: Did you find that anything in this thing *[SiS]* helped you visualise or get your head around visualising it?

P1: Yeah, inner joins and that, it was great how it showed. Because that was the hardest bit for me, it was great how it did loads of detail on that.

R: Now, there was someone who, we'll come onto how intuitive the whole thing is, there was someone who, I don't even know if they're here, but there was someone who did no joins or pretty much no joins in SQL in Steps.

P2: I think it might be me *[looks at statistics sheet]*. I only did 3 joins.

R: Someone wrote on a questionnaire somewhere that they didn't know how to do it.

P2: I think that was me, maybe I was thick or something but I didn't really...

R: Don't say that, I should have made it more obvious.

P5: It took me a while to find too.

P2: It wasn't readily apparent.

P6: If you had the same inner joins and you could see them graphical how it connected you could have this option to press inner join. That could help.

R: So did you find out...

P1: I've forgotten, I've forgotten what the software looked like.

R: I'll show you in a minute. So, did you guys work out how to, if the joins weren't very obvious, did you work out how to query from one table any easier?

P1: Yeah

P6: Yeah

R: I've got some screenshots here. If you remember, that's pretty much what it looks like. So to query from one table you just click on the table *[points at screenshot]* and to do a join you click on the connection between the two. Did you find it more obvious that clicking on the one table.

P2: Yeah.

P4: Yeah, yeah, I'd say so.

P6: Yeah, although you can do it graphically, you should be able to do it here also *[points to the main window of SiS]*, choose the table and add the joins.

R: Without that *[points to the database visualisation]*.

P6: Yeah, so you don't have to use that.

P1: That's *[points to the database vis]* actually really good to have like that.

P6: Yeah, its good to have.

P1: But I forgot that I could use it, click on it.

P6: Yeah *[agrees with P1]*.

R: So you thought it was just for looking at?

P1: Yeah.

R: Anyone else?

P4: I think the main thing I found useful was that each line of the query was in order

so you started off with SELECT then you choose FROM and then you do your WHERE statement and then your HAVING or GROUP BY and finish by ORDER BY as well.

R: Yep, and LIMIT on the end.

P4: Yeah.

P1: In the FROM, the text box is a bit difficult, don't you have to write out bits yourself?

R: For FROM? You can customise them yourself

[Researcher gets the screenshots out]

P1: I notice I didn't use the help feature once.

R: Yeah, nobody did, did they?!

P2: *[reads from statistics sheet] "Help clicked once".*

P3: I clicked it twice but it didn't help me.

R: It didn't help you?

P3: Not really, no.

P1: Where is the help button *[looks at screenshot].*

R: OK, yeah, that's definitely something I want to talk about.

P2: I think the help was before you actually launched it.

P6: *[in agreement]* Ah, OK.

R: Can anyone spot the help button on there *[a screenshot]*? Anyone that didn't use it.

P1: No.

P2: No.

P4: I think I accidentally clicked on it.

R: Oh, your one *[help request]* is an accident!

P6: I think that's it *[points to question mark].*

P1: Oh, its a question mark. No I don't remember that.

P4: *[in reference to opening the help once]* Because I remember like a splash screen.

R: A pop-up *[where the help is displayed]*?

P4: Yeah, and I went to go and close it.

P1: *[jokes in reference to the help]* Go away!

R: So, lets talk about that. I'll explain it seen as no one here knows what it is. Basically, on every clause *[spreads out screenshots]* there is a question mark in the top right, if you click it you got a screenshot like this *[holds up screenshot of help]*. On it there is three sections: a description of what the clause does, an example query within the context of the database you're working with and the results of that query. So this database that all the screenshots are from is about superheroes and the help says: *"With the following query we can show how many entries there are in the powers table for each hero ID"* and it gives a query showing the GROUP BY functionality and the results of it. I initially thought that was going to be awesome because you've got demos in the context of what you're working with.

P1: Yeah, that'd of been good but I never even spotted that.

P2: I think if I knew that that was available I would have used it a lot more because it looks like a really helpful thing.

P1: You should have like what Microsoft word used to have, like a little paper clip at the side.

[laughter all round]

R: All the examples were using the database you were working with, they're all automatically generated so whatever database you're using you have an example to look at within that context.

P1: Yeah, that's a good idea.

P6: Yeah.

P2: That would be really good

R: OK, so next question, how do you get people to notice its there? Because you weren't alone in not using it. I think, overall I had just over 5500 queries submitted and 8 clicks for help. And one of them was by accident as well *[referring to the accidental click by P4]*!

P6: Maybe its because its too far away from the actual work. It should be here *[points*

to top left of display], next to the SELECT title.

P1: All it needs is a bubble to pop out to say *"Do you need help?"*.

P6: It could be annoying though to have the bubble.

P1: But then you'd have a tick box to say don't show me this again.

P6: But then if you want to see it, how would you find it? If I said *"Don't show it to me"* but then I want to see it.

P1: !h, if you don't want to show it, it could turn back into that *[points at question mark button]*.

R: So it'd go from something bigger to *[gesticulates to something smaller]*

P1: Yeah, like a pop out bubble or something and then when you click don't show again it just stays like that *[points to help button]* tiny little thing.

P6: I think it needs to go somewhere here *[point to top left]* that would focus the user on it, it would be easier

R: OK, so something more obvious. Do you think its obvious what it is help. When I built it I thought, *"the universal sign for help is a question mark right?"*

P1: No.

P4: For tourism its *"i"*.

R: It is, yeah, like information.

P6: It should say *"help"*.

R: What, the word help?

P6: Yeah.

P1: Yeah, in a big red text box.

R: Something else we did for help was, I created a screenscast video and uploaded it to YouTube for each clause explaining how to use each one so it explained how you do a join by clicking the connections and how you do a GROUP BY etc.

P6: I saw one of those.

R: Did you watch one?

P6: Yeah.

R: OK, hardly anyone did. There's like one of the videos with about 5 views on it and three of them are me!

[laughter]

P1: But that might represent, if you put this out to the public, how many people might go and watch the videos.

R: You mean it would scale up like that?

P1: There's loads of tutorials on Microsoft Word on YouTube but like less than a percentage of the people who use Word would go on a YouTube tutorial.

R: OK, but I guess that translate to some people struggled finding...

P6: It could be good to have these videos in here *[the SiS interface]*.

P1: They'd be really useful.

R: How could you make the videos more ... obvious I suppose?

P2: Well, where were they accessible? Were they in the help menu? You could embed it in the help pop-up.

P1: Yeah, if you want more information.

P6: Have a link.

P2: Make the help pop-up more obvious and embed the video in there.

R: The only reference to the video was on the card I gave you at the beginning *[of the study]*.

P6: That's why.

R: You think that's why nobody used it?

P6: *[nods]*

P2: I had no idea they were even there.

R: I think you're probably not alone there.

P1: Well, I opened the link and I just never watched them. Sorry.

R: So, if you didn't find the help thing and you obviously thought it would be useful but you just couldn't spot it, its my fault you couldn't spot it because you should have done.

P6: I clicked it *[the help button]*!

R: *[jokes]* It was probably an accident!

P4: I think with the help is that we'd rather go to Google rather than use the help that's already built in. So I remember, even while doing this, I'd open up a new tab, go to Google and type in *"I want to do this..."* rather than using what is already available on the website *[SiS]*.

P1: Yeah, or YouTube it. Because help on things *[software]* never tends to be very good. But we didn't read yours.

R: OK, so you think that help...

P1: Well, I have never used help *[in any software package]*.

R: Nobody uses the help in Word right? Nobody presses F1 or clicks the question mark.

P1: I don't use the help in any software.

R: So you always look elsewhere?

P1: Yeah, like YouTube. That's why your videos could be good.

P6: It doesn't mean help with the website, it means help with SQL.

R: Yeah, yeah yeah.

P6: It's not that the user interface is bad, users of the website are trying to learn SQL...

R: Do you think that there is problem with the help and confusing it with help using the tool rather than help with SQL?

P2: Yeah.

P6: Its hard to distinguish how to use the program with how SQL works.

P3: Could we put it *[the help]* on here *[points to text area where SQL appears]* or something? In the actual console, 'cos then it'll relate to the queries.

P2: There's a lot of white space

R: OK

P1: It depends on what monitor you've got

P2: Yeah but who doesn't have a wide-screen monitor in the year 2014?

P2: All this space *[to the right of the SQL translation]* could be used for the help.

P1: *[laughs]* Just a massive help button?!

R: You'll definitely notice it if its that big!

P2: Not really a help button, just like *[implying information, not just a button]*.

P1: Ah yeah, but you could have a really long query, you could have loads of SELECT and it could hide the help.

P6: You could have help for the SQL here *[alongside the results]* and...

R: *[in reference to the space available on screen]* SELECT does get a bit longer, like this *[shows screenshot]*.

P2: Yeah.

R: So that space *[to the right of the textual query]* does get used up a bit.

P2: Put it there *[next to the results]* then.

R: Well, equally that space gets used as well. But that's *[the idea of having more clear help]* is fair enough.

P1: Let me just draw my little *[paper clip help mascot]*.

P4: I think as well that colour, because its a blue icon and its right next to this toolbar *[the blue one at the top]*.

R: It gets lost a bit?

P4: Yeah, you're drawn away towards the toolbar rather than looking at this. If it was something that stood out a little more.

P6: Like here *[next to the clause title]*.

R: OK, cool. And would you put the videos in here *[the pop-up help menu]*?

P2: Yeah, embed the YouTube videos.

R: I like the idea of this button here *[points to large one drawn by P1 next to SQL translation]*.

P2: Its not really a button, its more like...

R: You could put actual help in there.

P2: Yeah, you could because like you've found the... If you highlight or maybe mouse over the SELECT statement it would come up with maybe information about what

SELECT does.

R: Do you think people would notice a mouse over, did you ever mouse over it for instance?

P2: No.

P1: No *[laughs]*.

R: Not to say its wrong you know...

P1: What was this bottom bit *[points to results section]* showing? Is it what your results are going to be?

R: That's the results of the query.

P1: Oh, so far?

R: The idea being that you can work with it graphically here *[query builder]* and here *[database graph]*, it translates to this *[SQL translation]*, which translates to those *[results panel]* results. So that would give you either an error message or the results, or something that says you've got no results. Do you think that's clear?

P6: Yeah that's clear.

P1: Yeah, that was good.

P3: How many error codes are there?

R: For SQL?

P3: Yeah.

R: Oh, I don't know, loads.

P3: I was thinking you could map them.

R: Map them to to?

P3: To English explanations.

R: Oh, some more useful explanations?

P3: Yeah.

P6: Like a compiler to show where you have an error.

R: To help you more closely than the error messages do. Because all the error messages did here, I don't think I've actually got any screenshots of any errors, but all the

error messages do is, in SQL in Steps, is shows you the error message you would have got if you'd typed it out.

P2: I had quite a few error messages with SQL in the console, SQLite, it just said syntax error and it would say *"near"* and then one of the commands used *[points to SELECT clause in SiS]* and I didn't really think that was particularly helpful.

R: Nope, you're probably right.

P2: If you compare it to the errors for syntax errors in C it'll print out the line and it'll have the line number and it'll have a little arrow showing where the error is if you're missing a semi-colon or missing a brace or whatever but with SQL it just says *"syntax error"*, it doesn't really say anything apart from that.

R: So you reckon the error messages suck?

P2: Yeah.

R: And they should be better?

P2: *[nods]*

R: That's definitely a fair comment. So, let me show you what it was like if you got an error message as well *[tries to get laptop up and running with SiS]*. Did anyone get any error messages in SiS? Did you do anything that caused errors?

P1: No.

P6: I don't remember.

P4: There was one that I detected with capital characters, it wasn't so much of an error it was just something that was a bit of a discrepancy between the command line and the... In terms of errors I don't think there were any error codes coming up *[possibly referring to SiS errors rather than SQL errors]*.

P6: Maybe you could write in here *[points to the SQL translation]*.

R: OK, who thinks that would be a good idea? You mean you could write in here *[SQL translation]* and it would change this *[GUI components]*?

P6: Yeah, because the point was to learn how to do that *[points to SQL translation]*

R: Yeah, yeah, that's right.

P6: So if you could actually write this and see it forming in real time *[indicating that the results would show in real time].*

R: So what do people think about that? About writing in there?

P1: That's a good idea. If you've got a massive long query and you just want to change one bit and you think: *"Oh I know..."* and you could just change that bit.

P5: It is also good practice to write in the console for when you need to do the coursework and stuff.

P2: It could be muscle memory or something, writing out the, I don't know if its muscle memory. If you write it out its easier to remember than just clicking on a button.

P6: If you write it you remember it better. Like he *[P1]* said, if you make a big query *[gesticulating to mean with the GUI components]* and you want to change something *[you can just type in the SQL box].*

R: OK, so how did you find...

P6: Because I thought I could write and I tried to click...

R: Yeah, yeah, I think you said it in a questionnaire, someone did, that you should be able to write in here...

P1: But not be forced, not say: *"now try it yourself"* or something because then you'll think *"no" [laughs].*

P6: Maybe if you make a mistake an undo button *[would be a good idea].*

R: An undo button, OK. So how did you find getting used to working out when you tick boxes and whatever, working out how that translated to something in actual query? Did you find it obvious or were you confused?

P1: It was good how it updated all the time.

R: *[to P3]* Are you not quite convinced, do you think it could have been more obvious?

P3: Yeah, I think, sometimes when you query does it, it highlighted?

R: Yes it does, yeah, like this *[gets screenshot of highlighted text immediately after a GUI change].* So every time you change something it highlights what you've just changed in the SQL. Did anyone notice that?

P3: Not really.

P4: I don't remember it, I must say.

R: OK.

P2: Didn't it flash the thing? like when you made a new...

R: It went yellow and then it faded away.

P1: Oh yeah, I remember.

P2: Can I point out a problem with it, the fade away. The alias box, for AS, every time you typed one character in there it would flash and another one and it would flash and flash and flash.

R: So it needs to wait until the end right.

P2: Yeah, until you've typed all of the alias.

R: I guess the problem is then how do you know when its finished?

P2: Press enter?

P6: After you exit the text box?

P4: I think what was really good as well was that you gave the whole horizontal width of the screen to the results and the command line. Whereas in the command line you're there trying to read *[across multiple lines]* its just a bit confusing but you've given it a nice, you know, a good amount of space so for lots of column names so you know, you're not struggling *[to read the results]*.

R: OK, did people find that annoying when they were using the actual command line?

P2: Were you using MySQL or SQLite?

P4: I actually did both

P2: I used SQLite and it didn't really have the stars you're mentioning, the output for the tables, even though it cut off the columns it was quite well displayed, I don't know, I haven't seen MySQL but there were no stars in SQLite.

R: They both do it a bit. They both expand onto the next line if you haven't made the console wide enough.

P1: Yeah, that was really annoying.

R: What about visualising the database, did anyone manipulate the graph on the right?

P6: I dragged it around.

P1: That's what I was just thinking about, the zoom in buttons are weird, you expect it to make that *[points at a section of the graph]* larger but then when you zoom in it actually goes into a different thing which is good but the zoom in buttons are a bit confusing.

P6: Yeah *[agrees with P1]*.

P1: You could almost do with two other buttons.

P6: What about scrolling?

P1: Oh yeah, scrolling to zoom.

R: You can scroll in and out to zoom.

P1: Oh, OK *[never noticed that]*.

R: Did anyone look at the database bigger like this *[holds up screenshot of full screen database visualisation]*?

P3: No.

P5: No.

R: Basically that is, if you click expand, the green arrow one, you could view that in a bigger screen.

P6: It would be good to change it to be able to do UPDATE or INSERT or whatever.

R: OK, so you think it is limiting that it only does SELECT queries?

P6: Yeah, you could have a different mode for CREATE or whatever.

R: How do you think that would look?

P6: Maybe you could have another... This *[SiS as it stands]* could be for the selection and you could have another tab to create a table. You could choose from a drop-down CHAR, INTEGER, etc. It would make it easier to write a table *[CREATE statements]*.

R: What did you find the hardest aspect of SQL? SQL in general, so there's a few different bits; you can create tables, you can alter them, you can insert data, you can update

them.

P6: In the first week I had difficulty with the foreign key.

P1: *[In reference to the FROM clause tab]* I just found that difficult because I wasn't using the clicking thing *[the database graph]*.

R: OK, so this *[holds up FROM clause tab screenshot]* is the FROM tab. We have already clicked that we're doing a join by clicking this *[points to connection on database graph]*. Then when you go to the from clause it builds this, the idea being that you can change it from an INNER JOIN to a LEFT JOIN.

P6: It should always be like that *[the FROM clause tab shouldn't require interaction with the graph]*.

R: You can manually change these *[the join type, conditions etc.]* if you want to.

P1: Yeah, I didn't realise that you clicked on it *[points to database graph]* to join them so that's why I got confused.

R: So it wasn't obvious that you had to click on *[them to do joins]*?.

P1: No, apart from that it was a well good set-up.

R: So, that's the same sort of thing *[points to screenshot of FROM clause]*. You'd click here and you can change where the join appears *[FROM/ON or WHERE clause]*. I think it was you *[P2]* that didn't like this notation with *"INNER JOIN something something"*.

P2: No *[agrees]*, I just used WHERE.

R: So you separated tables with commas and added conditions in the WHERE clause.

P1: I put both in my coursework.

R: Did anyone use this *[the option to swap from one join type to the other]*?

P3: I haven't used it.

R: OK, did you do many joins with yours?

P1: That helped me a lot those joins, 97 percent of mine were joins.

P6: You *[the researcher]* showed me how to do joins, you showed me what to click.

R: Oh, OK, did I? Do you think you would have found it out otherwise?

P6: I did try once but I couldn't find how to do it.

R: OK.

P6: You should be able to change them like this *[on the FROM tab].*

R: OK, lets talk about... I guess basically what I'm after from you guys today is what we can change to make it...

P1: It was really good though the software. You shouldn't think that we're blasting out criticisms.

R: I want you to blast it.

P1: I was well impressed with it, I thought it was great.

R: So the big thing I want to get out of this is what you would change to it to make it ready for mass release so if we wanted to make it available to everyone what would we have to do to make it ready for that. Because its not.

P1: Like main points?

R: What are the worst bits I suppose?

P1: The help button.

P6: The help button *[should be]* in writing.

P1: Yeah, the help button in writing and the telling people that you click on this *[the database graph].*

P6: The inner joins should be there *[in the FROM tab]* all the time. You should be able to choose the inner joins from here *[the FROM tab].*

R: OK, so you should be able to build them without clicking the visualisation?

P6: Yeah.

P1: Yes, unless you tell the user because I didn't know you could click on that.

R: I guess it comes back to the paper clip again, how do you tell them?

P6: Nobody reads the manual but you should tell them.

P1: *[laughs]* yeah.

P2: I think if the first time you launch SQL in Steps it should come up with a bunch of speech bubbles over all the aspects saying like *"click this to access..."*.

P1: Sometimes that can be really annoying.

P2: I know its really annoying but if its not obvious how to do it, it should tell you.

R: OK so you either do that or...

P1: A *"take a tour"* button.

P2: Yeah, I think at the start you should say *"how much experience do you have in SQL?"* and they can say *"no experience"*, *"some experience"* and depending on that it could highlight certain aspects of *[SiS]*.

P1: It sounds like a lot of work.

R: That makes sense but I guess I'm thinking how much you would use these things or how much would you just keep saying *"ask me later"*?

P6: I would do that. I would never use that. It is easier to make it more obvious rather than teach people how to use it properly.

R: Yeah, yeah yeah. That's what I was going to say as well, rather than working out how we can tell people how to use it as it is, how can we change it so we don't have to tell people how to use it?

P6: You don't have to use this *[the database graph]*.

R: So people mainly used that *[the database graph]* as a visualisation then right?

P2: Yeah, I had no idea you could actually interact with it, I just thought it was a representation of the tables.

P1: Yeah, me too. That's a big thing.

P6: If you can do that *[build from clause without the DB graph]* it doesn't matter if people know how to use this *[the database graph]*. If they can, that's good, if they don't then it doesn't matter.

R: What would it look like, to build a FROM clause without clicking anything?

P6: You could choose a join like *"No joins"*, *"INNER JOIN"*, *"LEFT JOIN"*,... and then you have a drop-down menu with the tables in it.

P1: Yeah, I swear that's what it was like. I swear you had some like the grid *[on the SELECT clause tab]* which you can just *"FROM that to that"*. You just select the

ones you want, like that on that table to that on that table.

P6: Like this *[shows screenshot annotations to researcher]*

P4: Sorry to interrupt, I think the thing is, its a small deception with the visualisation is that the join buttons are slightly bigger so when you go to click a table you're not really thinking *"I want information from this table"*, you're automatically drawn to the joins and when you click them is sets that *[the FROM clause]* and you still... I think that's where the confusion is, if I want to see a specific join statement I can easily see where to click but, in terms of adding multiple ones for example ...

R: So if you were joining three tables together ...?

P4: Yeah, I don't think there is as much support for that.

P6: Yeah, you can't do that, can you?

R: You can, you can just click another one so if you click another one...

P1: Oh, these are the joins *[points to database graph on screenshot]*.

R: Yeah, so if you click ...

P1: Oh, I've only just figured that out.

R: If you click ...

P1: So you don't have to click the line, you just click the *[points to orange box]*...

R: *[drawing on screenshot]* So you click that to get a join and it would join this one and this one. If you wanted to join this one as well you would click this.

P6: When you look at it you think that this *[circling a join node in the graph]* is a table, the big one and that small one *[the table in the graph]* is something else.

R: Oh, OK.

P2: Yeah, that makes sense.

P1: Yeah, that's what I thought. I was just like what are these small things *[points to tables on the screenshots]*?

P6: Agrees.

R: OK, so did anyone notice the key at the top then?

[participants all look at screenshots for the key]

P2: Oh, yeah!

[Gradually all the participants spot the key above the database graph]

R: OK, so obviously nobody knew it was there.

P2: That's hilarious *[the fact nobody noticed it]*.

R: OK so how do you make it more obvious then?

P6: Make the tables bigger.

P2: Yeah, make the tables bigger. Make the table boxes the biggest boxes there.

P6: Maybe you could make this *[the connection box]* more long and thin?

P2: Yeah. Maybe have them different shapes instead of all just rounded rectangles.

P6: Could be like circles.

P1: I don't know man, that's a hard one. That is hard but like, it would just require, yeah, I don't know.

R: That's what we're her to discover though, that's what we're here to find out.

P1: Its easy to say but its quite difficult because there is more writing in those *[the connection nodes]* but you want them to be a smaller box.

R: Yeah, but I think its important to show that information because the number of people with joins that can't work out that the ON bit (or the WHERE bit) is just the bit that connects them together. Some people find that really hard to grasp.

P6: It should be here *[on the graph]*.

R: So it should be there but draw people in more to the tables? I guess most people's first query is something like SELECT * FROM one table.

P6: Yeah.

R: If you zoom out on the zoom in and out there are four levels.

P1: Yeah, that's not clear.

R: That's not clear?

P1: Not at all. You would think that zoom in would just make that *[the visualisation]* larger. 11 **P6:** What does it actually do?

R: If you zoom in you get...

P2: You get different levels of detail. I think maybe the levels of view should be in a drop-down menu.

R: Ah, OK so a drop-down menu.

P1: Yeah, that would be cool.

R: *[explaining the zooms to P6]* This *[screenshot of expanded database graph]* is just a bigger version of that *[screenshot of small database graph]*. If you zoom in one step from there *[the default]* you get attribute names, if you zoom in again you get data types like VARCHAR. So there is 4 levels, there's the really detailed one with data types, theres the one without the data types, theres the default one and if you zoom out from there you loose the joins and you just get tables. I made that *[the graph with tables and joins]* the default because I was worried you'd never discover the zoom buttons.

P6: It could be the default but if you change the shapes and make it more obvious. You imagine the tables to be big.

R: Yeah, you do but I guess you could say that if you join two tables together you get an even bigger table.

P1: You learn joins after, you don't learn joins straight away so it would be better starting off with a simple and then maybe when they get onto joins ... I don't know, its hard ... when they get onto joins ...

P6: You should not have these buttons *[the zoom in and out buttons]*, you should have a different icon.

P1: Yeah, those buttons need to change.

R: Zoom in and out need to change because its not zooming in and out?

P1: Yeah, its not actually zooming in and out that image.

P6: Maybe you could have *"show joins"*, *"show attributes"*.

P1: Ah, like a checkbox?

P2: ooh!

P1: If you clicked show joins these popup in the middle *[points to joins on the graph]*

then you could keep the boxes the same size

R: What do you *[P4]* think about that?

P4: Its a really good idea.

P1: That almost works better than a drop-down because you can select all the ones you want and even take away the tables.

R: Yeah, not quite sure how that would work but yeah?! OK, that's pretty good. So now you're doing your coursework without this, how do you find visualising the structure of your movies database.

P6: I finished my coursework while it *[SiS]* was still on.

R: Did you?!

P6: I didn't use it, I finished it the same day, the Monday, two weeks ago.

R: Oh, I disabled it on Monday morning like 8 o'clock so unless you were really rapid ...

P1: Yeah, half six get up and do coursework!!

P2: The way I visualise the movie tables was I ...

P1: Have you got the answers?

P2: No *[laughs]*!

P2: I used .schema, or whatever the MySQL equivilant is, and then I just draw out the name of the table *[shows example]*.

R: OK, when you had access to SQL in Steps, did you do that *[draw out the structure]* or did you just use that *[the database graph in SiS]*?

P2: I did that *[drew it out]*.

R: How did you *[P4]* find visualising the database?

P4: Visualisation, I normally do it in my head.

R: Do you find it OK to do it in your head?

P4: Yeah.

P6: Yeah *[nods to agree]*.

P2: I can't do it in my head.

P4: But I think the main thing is when its, when you're talking to someone else I prefer

drawing, I'll draw on a piece of paper what I'm trying to say.

R: How would it look, would it look anything like that?

P2: I did another one *[drawing of the database structure]*.

P4: It would basically be a rough sketch of a few boxes.

R: Like this *[holds up P2's drawing]*?

P4: Yeah basically, with a few arrows going all over the place.

P2: I did another one for, I've forgotten which exercise, it was something to do with employees. *[hands drawing to researcher]* But that one has the foreign keys and parent keys on.

R: So I guess that's kind of on a similar sort of scale to that *[the database graph in SiS]*?

P2: Yeah.

R: Has anyone else got any more comments about that bit *[the database visualisation]*?

R: What about names for the different bits, what would you call them? Its obviously split into 4 parts.

P6: Not everyone knows what alias is.

P1: What's alias again?

P2: Alias is AS, so like do you know what AS is? So you can say something AS *"c"* and then when you refer to it again you can just use *"c"*.

P1: It took me a while to get that.

P6: I only know what alias is because I used it in UNIX.

R: As far as the UI itself goes what would you name the components?

P1: They don't need names.

P2: *[writing]* Results, query, ...

P1: They don't need names do they?

P2: I think they would need names if you're planning on releasing this to the general public.

R: Presumably if we're going to refer to them in some help manual they'll need names.

P1: Well, again that popup bubble might popup and say *"do you need help?"*. There

could be a screenshot of the sections and *[gesticulates to suggest an arrow pointing]* this section shows the SQL, this shows that etc. Yeah, so when you press help it comes up with this screen *[points to screenshot]* and says: *"this is your query"*.

P6: I really don't like the idea of popups.

P6: Its pretty obvious I think.

P1: Its only obvious to us because we used it. Before you've got a query that *[the SQL panel]* is just empty.

R: When you loaded it up, some of you I might have sat you down and tried to give you a demo of it, I don't know. When you first loaded it up, especially those I wasn't showing it to, what were your first impressions?

P2: It was a bit ...

P1: Where do I start.

P2: Yeah, it was like where do I begin.

R: So you think you need something to guide you as to what to do first *[would be good]*?

P2: Yeah.

P6: Actually I thought it was OK, I saw SELECT so I started with SELECT. For me it was OK, I like that its big and it has a lot of white space, I wouldn't like to ruin it with putting writing everywhere. You want to keep it simple and appealing.

P1: Yeah, you want it to be like Google, really simple.

R: *[to P6]* Do you think it is appealing?

P6: Yeah, because there is a lot of white space and its a good structure, don't ruin it with popups and arrows.

P4: I think the one thing I definitely wouldn't change so much is the graphical interface. I know we've said the menus, the zooming in and out *[are not so good]*, but the actual functionality behind the visualisation like dragging it around and actually zooming in and the results you get from zooming in if you figured it out are really good and I think its really helpful to have the results always showing up as well.

P1: Yeah, the live results *[are good]*. Its all useful, its all really good.

P6: Yeah.

R:OK, what about getting some feedback from an idea discussed with someone else, it was about, we have no idea when you start a query or when you're happy with the results or when you've just given up or whatever. If we became aware of that and you had some sort of a finish or clear button and then you could maybe ...

P6: Save it.

R: You think it would be good to save it?

P6: Maybe you want to do work with it *[not just as an educational tool]* so you could use it and save it, save the SQL command or save the tables.

P1: Go back and edit it or modify it.

P6: You could have a home where you can upload your databases and see your queries with a description of what it does that you *[the user]* write.

R: So you could have like a bank of your own queries?

P6: Yeah.

R: When you load them would you want to see just the SQL or the GUI and everything else?

P6: Just the table and the SQL.

R: Just this *[The SQL panel on the UI]* and this *[The results panel on the UI]*? Or would you like to see everything?

P6: If I log into my area I would like to see this *[The SQL]*, this *[the results]* and maybe with the option to see everything else *[the rest of SiS]*.

P1: There should be the option to show the whole of SiS.

P6: After you've made it *[a query]* you basically need this *[the SQL]* and this *[the results]*.

P1: Surely when you load it up it would just come up with this screen *[the SiS window]* again?

P6: Yes, when you load it up, but when you are on your main home you could see your SELECT *[queries]*, a description and show the table *[the results]*.

R: Do you think you guys would have saved stuff, if you managed to get a grouping thing

or a join nailed would ...

P4: *[shakes head]* I think 1400 queries *[that I executed]*, I doubt I would ever want to go back to those.

R: Yeah but you wouldn't ...

P1: You only save the ones you wanted to *[go back to]*.

R: Yeah, you'd only save the ones you wanted to so a couple of hundred of those *[1400 queries P4 referenced]* might have errors in them but if you got to a point where you were happy with your answer would you save that for future reference?

P4: I think the most I would ever save is the results, not the actual queries themselves because there is so much margin for error when you're making a query, if you save a query you could end up making the same mistake over and over again, whereas if you save the results you can say *"these are the results I wanted for that query, double check it, oh wait, we found a mistake, or it is actually the same results as we wanted"*. You're never going to compare two queries but you might compare two results.

R: *[to P5]* Do you think you would use a save and recall thing?

P5: Yes, I think that for some of the queries they were quite tricky so it would save a lot of time and would make you do these queries on your own.

P6: Maybe you could do it not just for learning but for doing actual work with. Maybe import it into PHP, to use, not just for education.

R: For the weekly workbook things, did anyone find themselves using that *[SiS]* and then just copying and pasting it?

P2: No.

P1: Yeah.

P3: Yeah, a little bit, yes.

P1: Only for one though because then I knew what I was doing. But I thought *"there is no point in me just rewriting that if I know its right, I might as well just copy it in and ..."*

R: *[To P3]* Did you do that as well? There's nothing wrong with it by the way, I'm not here as a TA today! After you'd done that, did you find when you did the next one ...

P1: You could do it *[without SiS]*.

R: Did you find you relied on it too much?

P3: No.

P6: I just messed around with it, basically, just see how it works, I didn't do the coursework with it.

R: On the copy and paste thing, what about if there was some sort of limit as to how often you could copy and paste so if we said to you *"you can only copy and paste three times"* or something, do you think it would make you think about copying and pasting or were you not doing it anyway?

P1: No, its not the software's decision *[to decide when you can copy and paste]*

P6: If you don't copy and paste you can just see it and write it, its the same thing.

R: I guess so but if you see it and type it out at least you can learn it a bit.

P1: But you might just want to copy it in your spare time or something as practice. Just like, oh yeah, I'm getting that, copy that.

R: Do you think limiting copy and paste, because I wouldn't want ... Obviously the aim of learning SQL is eventually to never need this and you should be able to just type it out like you are now. With copy and paste there is a worry that they might become too dependant on that.

P3: You could just restrict it.

R: So you couldn't do it at all?

P3: Yeah.

P1: No, a lot of people wouldn't be happy about that. If a company wants to use it or an educational establishment you could have certain options to turn off copying. Say if the lecturer wanted to teach it to us he could say right, you can use that but you can't copy and paste.

R: The aim of this tool is purely as an educational tool, its not really designed to be something . . . because its executing so many queries, every change you make executes another query, so if you put a massive database in there, like the Amazon customer database, and as you were typing an alias it was re-executing it with every keystroke, it might take you five minutes to run that query each time so it doesn't work like that so one of the limitations is that it is aimed at education not at the mass market.

P6: If someone wants to learn maybe they won't copy and paste? If he wants to learn

R: But then there are some people on this course that I'm pretty convinced don't want to learn!

P6: They shouldn't take this course then!

R: No, you're probably right!

P6: If they want to use it to help them learn they can but if they want to use it for more . . .

P1: I guess it comes back to . . . say you were head of plagerism *[at the university]*, you can't just take away copy and paste from a computer to stop people copying from websites, so its that sort of scenario.

P6: You could still find something similar on Google if you searched for it.

P4: I think the worry is, because you've got the actual tables you're using in the workbooks, the fact that you can't copy the queries basically makes you have to learn the queries but it does teach you is what you're meant to think about and the order you're meant to think about writing queries and actually constructing a long to answer those specific questions.

R: So you'd keep copy and paste there?

P4: No, I definitely wouldn't. But, what I would keep is the fact that its a step-by-step process to making a really long query.

R: OK, we've obviously got a bit of a split decision, some people feel you should keep it *[copy and paste]* and some people feel you shouldn't, what about this idea of

limiting your use to it. And then you could have to earn, almost in a game respect, the idea of earning credits for getting things right.

P2: Gamify SQL in Steps?

P3: I've actually got a better idea, what if we do some trivial questions. Once they press control C, before it lets you copy it to the clipboard it'll ask you a trivial question about that statement. So it'll be like: *"what does inner join do"*?

R: And if you answer it right you can copy it?

P3: Yeah.

R: What do you think about that?

P1: No one would have thought about it if you didn't bring it up. If people are going to copy it they're never going to learn it. Because I did it, I copied the first one but then I found it quicker to write out because I knew how to do it and I knew what the sequence of the next statement looked like. If you want to take longer to select all the things and take time to copy and paste it then, you know, you have a chance of failing the exam, its almost your choice.

P6: Yeah, exactly.

R: What about if these things were, like you *[P1]* were saying, there are a load of options that are universally set across the whole thing so you can really tone it down if you were teaching this to ...

P1: Like admin options?

R: Yeah, you can totally remove any clauses and stuff so if you were teaching it to year nines in secondary school you might get rid of grouping and ordering and just have SELECT FROM WHERE.

P6: But you could have it and not use it *[some clauses]*.

R: So do you think it should be an option to ...

P1: Yeah, in week 1 you could only have FROM and as you progress through the weeks you get WHERE etc.

P6: I think no, it limits you. If someone gets it why not try something else. If you don't

want it then don't use it.

R: There is two of you in here, I've no idea who, that used the HAVING tab.

P2: I've got a having thing on mine *[statistics sheet].*

R: You haven't been taught it at all.

P2: We were taught HAVING, well, it was mentioned. That's why I used the HAVING, it was mentioned briefly in the lectures and I thought *"whats HAVING?"* so I thought I'd give it a go.

R: Did you get what it did?

P2: Erm, no!

R: OK, *[jokes]* you should have clicked the help button!

[laughter]

R: OK, that was my idea of not restricting it too much, because an option was to have it so in week one you were just doing SELECT, FROM, WHERE and ou could take out the others but I wanted to encourage some exploration.

P1: That's cool.

P6: Yeah.

P2: Yep.

R: So I wanted you to, like you said, hear about HAVING and give it a go.

P1: In the labs at uni is a bit different to like year nines learning it or something.

R: Yeah, that's what I mean but you could tone it down, sorry, that's where this thing stemmed from, the copy and paste thing so you could put a limit in there so whoever was administrating the course could say . . . do you *[P1]* think there are any scenarios where no copy and paste would be a good idea, like teaching to year nines for example? Or do you think there are any times when you might want to give them a question or, something I thought of was, when someone copies it, it copies it with a load of blanks in it.

P4: That would work, yeah.

R: So then you'd copy and paste your join but it would get rid of INNER JOIN and

you'd have to enter it yourself.

P2: I think that would just be misleading.

P1: You just wouldn't check it

R: You mean you'd just get people running it and getting an error?

P1: Yeah, they'd just paste it and think: *"what's going on?"*

R: OK, what if there was an intermediate step, like, you pressed control C and you got a popup and it said like *"Fill in the blanks"* and then you can press copy.

P2: I think you should try and dissuade people from trying to copy and paste like maybe popup a warning or something saying *"If you copy and paste you might not learn as effectively as if you type it out"* or maybe have a limit of five copy and pastes or three copy and pastes or whatever and after you've used all of those have a popup saying: *"you're copying and pasting a lot, you might not be learning as effectively"* then ask if you want to refresh how man copy and paste you have.

P6: Maybe that but you should still leave it.

P1: Yeah, you should have a choice.

P6: There should be a warning if you do it all the time.

P1: The people who copy won't do as well in the exam or whatever but comes to not using your software they might not be able to do this stuff.

P4: I don't know, there would have to be a question bank.

P3: That's what I mean.

P4: Because you were talking about alternatives to copying like having some sort of barrier so either questions or blanked out syntax, he's basically asking for a question bank which isn't bad if you have a large enough question bank.

R: There are some systems out there that work with question banks but not quite in that way. They give you a question and you will try and answer it and when you click finish it says *"you didn't quite get this right"* or *"you did get this right"*, the reason I wanted to stray away from that was because you then give someone like the lecturer the job of filling out 300 questions and model answers and again I think it

stops that exploration desire because, if you load this up and you don't get given a question then you can just explore the different bits like you *[P2]* went to HAVING whereas if you get a question, what I was wondering was if, when you loaded it up there was just like a *"Finish"* or a *"Clear"* button. If you click finish when you get to whatever answer you were looking for, what about looking at what you've done as asking *"is this what you wanted."*. If someone has clicked clear because they've just given up then they could say *"no this isn't what I wanted"* and they could analyse that a bit and offer some help.

P1: Those never work either. Unless you create a really good one, I can't remember what software . . . If it says, does this work and you click *"no"* it never tells you why it didn't work or how you can fix it. And it *[answering questions about what you were aiming for]* should have to be a choice as well.

P6: You don't know what the people want.

P1: Maybe you're trying to do something which is impossible?

P4: Sorry to interrupt. On the copying, I've just thought of this, basically, you construct a query and it gives you some results and if you wanted to copy a query what you basically have to do is sort of what you said about having blanked out syntax but you have to fill it out on the screen and it could come up with a tick to say, you've done this right, now you can copy. So you're actually filling it out on the screen. There could be like a testing mode and an educational mode where you have exploration where it just gives you the syntax but you can't copy it and you have a test mode where you construct a query, it gives you the results and its copyable but its actually blanked out here and there so they might be a column that's blanked out, there might be an inner join that's blanked out, a WHERE that s been blanked out and you have to fill in that last little bit and then you say copy and it says, well actually that's wrong, fill it out again. Then you've got it and you can copy it but you've constructed it yourself, you've had to think about the different aspects of making a query and how they correspond to the results. That could be potentially

something.

R: Sounds cool.

R: OK, why do you think some people didn't use it *[SiS]*?

P2: I think because it wasn't really necessary to use it.

R: OK, I'll just tell you briefly some statistics, I took 101 of you guys and signed you up to the study, not everyone got to use it, some people didn't, it was about a 60:40 split so 60 people had access to it. Of those 60, 27 logged in at all, some of them logged in and loaded it up and quit. What do you think *[the reason for that is]*? Do you think its part of the study structure, do you think its me not pushing it?

P6: People have other things to do at university, maybe they just forgot about it.

P2: I think SQL is easy enough to anyway because we started SQL after 5 weeks and we'd done 5 weeks of databases *[theory in the lectures]* before that and about three weeks of C programming and some of us have programming experience before. SQL is a declarative language where you ...

R: Declare what you want, not how to get it.

P2: Yeah, its more obvious. I only used SiS to clarify things I already knew as opposed to learning how to do things. If you were doing well in the workbooks using just a console there is really no need to use SiS.

P6: It could be useful for people who are younger.

P1: Because the workbooks are actually pretty good so there is no reason for you to drag away from the workbooks, they sort of tell you how to do it.

P6: The workbooks are pretty clear.

R: So what about as an independent learning tool?

P6: Yeah.

P1: Yeah, it'd be really good. They'd buy it, you'd be rich!

P6: Its like Scratch, I wouldn't use Scratch in a university.

P1: Well, no, Scratch is different, Scratch is terrible but this is actually good.

P6: *[Scratch]* is good for when you're first start, before you've done the basics of anything.

R: OK, on that questionnaire, I think one of the questions was: *"Do you think you'd have done as well without it"*?

P2: Yes.

P6: Probably yes.

P1: Yes, but not everyone has those workbooks, those workbooks are well good!

P6: We already have lessons about SQL where you have to study ...

P1: If you don't have lessons then that *[SiS]* would be great ...

R: So if you did feel like you'd do as well without it, why did you use it?

P2: I don't want to say obligation ...

R: Its definitely not obligation, nobody else used it!

[laughter]

P1: Maybe I thought that because I've got access I don't want to waste having this access just in case it would be really useful. Partly curiosity.

P6: I was curious.

P1: I did use it for help.

R: How about you two *[P4 and P5]*, I think you two were the biggest users, you clearly weren't using it to make me feel good!

P5: The style of learning SQL can be useful because learning SQL is different to learning other programming languages.

R: That's a problem that crops up a lot actually, because its declarative, you describe what you want not how to get it.

P2: I think that made it easier though.

P6: It made it hard at first but its easy to get .

R: it can be hard to get your head around. I once had a student who was struggling to find the minimum value in a column. I asked them to describe what they were looking for and they said: *"we need to loop through all the values and keep track of the lowest one"*. They were just getting confused between declarative and procedural languages.

R: Another thing I wanted to talk to you about was Boolean expressions so like ANDs and ORs. So the Boolean expression thing. The WHERE clause and the HAVING clause,I realise you might not have used the HAVING but both of them use Boolean expressions. There was a feature in SiS about learning Boolean expressions and it visualised them graphically, if you look at this one *[screenshot]* here, did anyone use the WHERE thing? Its a widget based thing, you can drag and drop. You drag and drop a widget and stick some criteria on it *[draws out example on paper]*, maybe x=1.

P1: It was really complicated that.

R: Then maybe you drag another one in like x=2 and then you could put a Boolean expression round the outside and say OR.

P6: I never got around to it.

P1: I never used it.

P6: I messed around with it but I didn't know how it worked.

P1: No I didn't either, that was the most complicated thing *[in SiS]* I think.

R: What did you *[P4]* think about it?

P4: There was a slight bit of confusion as to what order it comes in. I remember creating a new box and the boxes stacked on each other so I was there thinking *"OK, what's gone wrong?!"* so I clicked it again so they're all stacking up on each other and I've entered a query and tried to run it and its running the empty ones first and coming up with a bunch of syntax errors and I'm like: *"Oh gosh"*. I think that was really the most complicated thing about it but otherwise it did sort of simplify three or four where statements.

R: People can find Boolean confusing so I wanted to introduce a graphical alternative to it, especially if they get complicated, people can struggle to get their heads round it. How would you visualise them better, you say you looked at it and couldn't get your head around it.

P1: I just didn't know what I was doing, it needs a help button!!

[laughter]

P2: I think maybe instead of having a box you could have like a line so you'd have like *[starts drawing on screenshot]* ...

R: Like a flow chart?

P2: Yeah, going procedurally through the ...

R: If I draw out *"(x AND y) OR z"* what would it look like. How could you visualise it?

P1: *[takes the paper]* You'd have a box for x, *[draws an arrow to a box for y].*

P6: You'd need to put it in another box.

P1: Why? You can always have brackets around the boxes but then still go like OR *[draws arrow to z box].*

R: If you do that why don't you just write it out? Look how similar that *[their representation]* is to that *[the textual version].*

P1: Yeah, I know.

P2: I suppose.

P6: Yeah, they're the same.

R: Did anyone find the written Boolean expressions complicated?

[Generally a no from everyone]

R: I know you didn't really have to do anything major, they were all like *"find the person called Smith or something"* but if you start heading down this way or even like *[draws (a AND b) OR (c AND d)].*

P1: Yeah, we've just drawn that *[the textual version]* but put boxes around it

R: Yeah, that's what I'm getting at

P2: I think we're not the best kind of group to ask about Booleans we're all doing 150 *[a Computer Science module that covers Boolean expressions]* ...

P6: We're doing other programming stuff so ...

P2: We've done Boolean expressions in C, Boolean expressions in 150 before doing Boolean expressions in SQL.

R: So you're coming into this ...

P2: Coming into this we knew about AND and OR and XOR and all those.

P1: Oh yeah, all those *[agreeing with P2].*

P6: It's easy for us to just write it like that *[the textual version].*

R: Does anyone struggle with Boolean expressions?

P6: If you're doing SQL you should know basic programming *[concepts like Booleans]* ...

P1: Its probably the one thing that's easy to write, or SELECT.

R: What did you *[P3]* think?

P3: I think its the syntax, you've got to get it right.

R: Of Booleans?

P3: Of SQL.

P6: Like the syntax of BETWEEN and stuff *[possibly suggesting they want guidance with functions used in WHERE]*

R: So what would that WHERE tab look like? If you think it was too complicated or even unnecessary, what would you do to it instead?

P4: I think, number the boxes is the first thing. So you know which one comes first and which one you created first, I know they can be dragged around but if you drag them in the wrong order because you're trying to shift things around.

R: So if you drag them in the wrong order ...

P4: Because you're not... When you create the box you're dragging them away from where you created them and you've got no idea which order they were created so it'll do sort of brackets... erm ...

R: So what if you created 1 and 2 and then switched them the other way around?

P4: Well, there shouldn't be that much difference actually.

P6: If its (1 AND 2) OR 3 you could change the 1 and 3 and it would be different results.

R: So what would the numbers do?

P6: I don't know.

P4: Its probably a bad idea.

P6: Yeah.

R: So you don't really think the Boolean thing is that necessary?

P6: Graphically - no. You can just ...

R: There is no need to make it graphical?

P2: No.

P4: I've seen pretty weird Booleans, it might be subqueries, am I thinking of the right thing.

R: Subqueries, yeah you could do something like WHERE ID = (SELECT...

P4: I didn't get the chance to try out a subquery in one.

R: In the WHERE thing?

P4: Yeah, it actually came up in one of the workbooks.

R: What about subqueries? Subqueries have pretty limited capabilities in this *[SiS]*.

P1: They're pretty easy I think, its just a query inside brackets.

P2: I don't remember having to use subqueries in any of the workshops or in SQL in Steps.

P1: You could use it in the coursework in the last question.

P2: Yeah but I didn't, it was optional.

P1: Oh, I did it because I've got them, I haven't got one question so I thought it would boost my marks a bit.

P2: But apart from that I don't remember using subqueries in any of the workbooks. It was like HAVING, it was only mentioned in the lecture, if you wanted to do a subquery it was optional and in your own time.

R: OK, I guess I should start wrapping this up because I know I've kept you here for a while. I want to summarise the biggest good points and the biggest bad points. So, the biggest good points ...

P1: The GUI *[points to database visualisation]*.

R: This bit?

P1: All of its good, the whole thing is really good.

P2: The user interface is good.

R: OK so what could we do better?

P2: I think the thing we mentioned before about being able to select and deselect tables and joins and view those.

R: The process of putting a join together?

P2: Yeah.

P6: Yeah.

P1: All of its good, it just needs some little extras.

P2: Some refinement.

P6: The checkbox *[indicated to the database UI].*

P1: Yeah, a checkbox there would be good. A better help button, being able to type in there *[the SQL translation].* Its all little things I think.

R: OK, so make it sort of two directional I suppose.

P6: Have joins here *[in the FROM tab].*

P2: I would say that, as a concept it all works really well, it just needs a bit more refining, making some elements more obvious.

R: OK, who do you think would be the best people to use it?

P2: Secondary school.

P1: And up, or anyone starting a company that might have to go through SQL training, basically the company could say like buy the software and make everyone go through the training process. That's maybe something you could think about later.

P6: If you want someone to manage a database cheaply, you could just train them with this.

P1: You could say, oh you don't have any experience but a day of learning that, well if you're a generous company...

P6: If you don't really want to do really complicated queries.

P2: People with little or no computing experience.

P6: Or someone who wants to start a company or make a website or something.

P1: But then, most companies have like ...

P6: A small one.

P2: Start-up businesses.

P1: Yeah, say you want to start up a business and you say like ...

P6: I want to learn all the aspects of actually doing it.

P1: Yeah and create your own database.

R: So you think you are not the best target audience?

[a few shakes of the head]

P4: I think we are, I think the problem with start-ups and whatever is you'd need to support the creation of databases. All the databases *[in SiS at the moment]* are preconfigured.

P6: Not to use for work, just to use for education. Maybe if you want to upload a database you can but you could have preloaded databases.

R: Did anyone use that feature *[gets screenshot of CREATE statements]*?

P5: No.

P2: I saw that in the pile and thought that would have been quite useful.

P1: What's it say?

P2: It's essentially like a schema.

P1: Oh, CREATE statements.

P6: Where is that?

P1: Where is that?

R: Where do you think it is?

P2: Help *[menu]*?

P1: Is it in the help?

P2: The mysterious help?!

R: Its not in help actually, if you don't know where it is, where would you put it?

P4: I don't think its on that *[the main]* page so I'm guessing the home page.

R: You can get to it from all of these screenshots, where would you put it? Draw on

where you would put it.

P1: *[you can get to it from]* All of these screenshots?

P6: Its probably this one *[the correct button]* because I don't know what it does.

P1: Oh, is it that one? I never clicked that one!

R: Ha ha, yeah, its that one because its the only one you didn't know what it does. Do you think that's useful information to see?

P2: Yeah.

P6: Yes.

P1: Oh definitely yes.

[nods from the others]

R: Where do you put it then?

P1: There but just make sure you label it better.

R: OK, what would you label it as?

P2: What is it meant to be? Is it like a ruler and a kind of square.

R: Yeah, its like a building thing because that's how they were built, that's the thinking. How would you make it more obvious?

P4: I'd call it whatever the syntax is, I think its like PRAGMA or DESCRIBE.

R: .SCHEMA?

P6: Describe tables.

R: OK, you'd write that on the button?

P6: Yes.

P2: Schematic I think, because that's what schema is short for isn't it?

R: I've never really thought about it, I guess it probably is, yeah.

P2: So you could just call it schematic or blueprint.

P6: Yeah, blueprint.

R: But I bet if it was a blueprint button you still wouldn't have worked out what to click.

P2: No, we probably wouldn't. Its kind of difficult.

P1: I think that is one that definitely needs a label or something or a bigger box

R: OK, will one of you draw on that top bar what you think those buttons should look like because I think you all agree that all that functionality should be there but its badly laid out right?

P2: Yeah.

P1: Yeah, like every button needs a rethink.

R: So zooming in and out is obviously not the right analogy, we've discussed those tick boxes.

P1: Yeah, like that and then you could still have that *[the zoom buttons]* just to make that bigger because sometimes on a massive screen that can actually be small.

R: What about the full screen thing, is that obvious, did anyone use that?

P1: Oh, the full screen thing is obvious.

R: Did you use it?

P3: No.

P5: No.

R: Did you ever need to use it? Did you ever feel it was too cramped in there?

[shaking of heads and no all round]

P1: I guess there could be an option to *[gesticulates to suggest moving panel borders]*, or can you actually?

P6: There is, you can I think.

R: I was about to say, did anyone do that, all the blue lines you can move around so you can . . .

P1: See, I would have made that *[the results section]* bit taller

P4: I remember making the visualisation really small and I couldn't remember how I did it! I was wondering, is this like an older version or a newer version or something.

R: Yeah, so you can drag all those blue lines out, in and make them bigger and smaller. Do you think they're about in the right position?

P1: Oh yeah.

[general agreement all round]

P1: That could be in the help as well: *"drag the blue lines to make each section bigger"*.

R: OK.

P2: I think I've got an idea of how to display this *[the CREATE statements]*; instead of pressing a button and it toggles up you can have a drop-down box for how you display it, you can display it as a visualisation or as the code and the syntax.

P1: Yeah, that could be in the checkbox and then the drop-down box at the bottom. Display as, colon, drop-down box (code or GUI). Yeah, that's cool.

R: What about, did anyone. This obviously works on any devices, its just HTML and JavaScript, did anyone try it on a tablet or anything? Do you think there are any requirements to have it work on a tablet or a phone?

P6: On a tablet maybe, not on a phone.

P1: That depends who you're going to reach out to. If its just education then no but if someone is running their business and like, oh, what's that query and they could look it up on their phone.

R: So that would go hand in hand with that saving thing?

P1: Yeah, so you could say, oh that query I did earlier and you could ... even if its just accessing your saves on your mobile or whatever.

R: Just accessing these *[SQL translations]*?

P1: Yeah, maybe not the whole thing but just those two things *[queries and results]*.

P2: A supplementary SiS app where you can get the query *[SQL]* and the table *[results]*.

P1: Yeah, the previous days or previous whatever queries.

R: But you don't feel any need to have like a tablet next to your computer or anything.

P2: No, I think it would be a bit too complicated I think.

R: Like a second screen.

P6: Maybe a tablet yeah but a phone is too small.

R: But you think reviewing things on your phone.

P6: Maybe reviewing, I don't think its necessary.

P4: I think tablets are definitely key.

R: You think it should work on tablets?

P4: Yeah, because so many people have got laptops instead of laptops.

P1: Yeah but you just ...

P4: Not everyone has computers nowadays.

P1: Its exactly the same as running it on a laptop or a computer though isn't it.

R: I guess the problem with a touch screen is that as soon as you want to type something the display shrinks by about half because the keyboard comes up.

P2: Good point, If you want to use the alias command.

P6: That's a good thing about it *[SiS]*, you don't have to type if you don't want to.

P4: That *[the shrinking screen]* applies to all websites though so any website that has to type something in, it automatically zooms in on the textbox and then you type and it zooms back out

R: Yeah, I guess so. So what changes would you make to get it working on a tablet?

P1: You'd keep it the same. Tablets are supposed to be small laptop screens ...

R: Yeah, I think the biggest difference is the keyboard thing, if you were typing an alias in or you wanted to tweak this join the WHERE clause where you actually have to enter things in and you can't not type, as soon as you tap on that textbox everything is going to shrink, everything will move around.

P6: You could have they keyboard just cover it *[gesticulates to suggest the keyboard over SiS rather than moving it]*. When you finish the keyboard disappears. So you don't have to shrink it and mess with the layout just have it so when you press you can just type what you want and go back.

R: Like overlaid over the top you mean?

P6: Yep.

R: But overall, as far as tablets go, you *[P4]* think it would be important to have it run on them?

P1: Yeah.

P4: I think most definitely, because its a website its something you want people to access

from anywhere and that means any device and that means on the train home etc.

R: It does but how many people do you think learn SQL on anything other than a desktop?

P1: It wouldn't be about learning ...

P2: I think if its for educational use and in classrooms they're not going to have tablets, they're going to have desktop PCs.

R: You'd be surprised how many schools have tablets.

P2: Yeah, but will they have tablets in place of desktop PCs?

R: Erm, not in place of, they're actually phasing out IT suites in a lot of schools and phasing in laptops so the teacher just takes all the laptops to the classroom.

P2: OK, that seems feasible, I'm not sure about tablets though.

R: I suppose they've got kind of different uses but I guess the question is: how often do you think someone learning SQL would do it not on a laptop or a desktop?

P6: Not very. I think tablets are more for gaming rather than actual ...

P2: I don't think this is the kind of thing that would be done properly on a tablet, it wouldn't be as easy as doing it on a desktop because you'd be doing SQL itself on a desktop or laptop, you wouldn't be doing SQL on a tablet so I think it just makes a better working environment.

R: Does that make sense to you *[P4]*?

P4: When you started mentioning children using SQL in secondary schools, the fact that they're using laptops, desktops and tablets, you want support for tablets because even though there is a massive issue with the keyboard ...

P1: Tablets definitely.

P4: ... They're already used to whatever device they use so for other websites that have got a large amount of text areas and input of text they're already used to that idea of *"click on this"*, it focusses on that and the keyboard comes up, type in what you need and zoom back out when you're done. So I don't think zooming in and out is a problem.

P1: Yeah, I know people who use tablets for everything.

P4: Because its a website it should apply for all alternative devices.

R: It will work on tablets or any other devices, it doesn't use any flash or anything like that so it will work, its just not optimised for it.

P4: There is a tonne of space that you could have collapsible when the keyboard does popup.

P1: Or, I don't know how hard it is, just move the whole thing . . . oh no, that wouldn't work.

P6: I think putting it on top is better.

P1: But then you've still got to move things around because it might come up over where you're typing.

P6: Maybe you just see this *[the bottom part]*.

P1: I guess it just depends on some calculations so if there is anything in there *[the top]* the keyboard can come up and over the screen and if they're editing anything there *[the bottom]* it just moves the whole page up. A bit like Apple's new iPhone, you know, when you double click the whole thing comes down in the sense that it'll just move the whole thing up so the screen would be up there *[the top]* and the keyboard would be at the bottom

R: I guess you then have the opposite problem, what if you were typing at the top of the screen?

P1: Well, the keyboard would just come up there anyway because it wouldn't matter *[about covering the bottom]*.

R: Ah, OK, I see what you mean.

P4: It is definitely significant, like vital, for this to be a marketable product, tablets are just as important as desktops.

R: Yeah.

P1: Yeah, some people just have a tablet, they don't even have a laptop or computer.

P6: But if you're trying to learn SQL you're not going to be on your tablet for a long

time. Its good to have the option but its not something that people would really use. I don't think someone with just a tablet is really interested in learning SQL.

R: Do you feel like you needed any feedback from anyone about what you were doing? Did you want anyone looking at what you're doing and responding to that?

[all except P6 shake their heads]

R: So you liked it as like a ...

P3: I just liked doing my own thing really.

R: So you wouldn't want, automatic or a bloke behind the scenes, going *"it looks like you're trying to do this, try this"*.

P6: Maybe you could have a test if you want to actually want to test your skills or something.

P2: That's a good idea.

P6: You could work with a database and get asked questions.

R: So some sort of testing, would you use that?

P2: Right now I used SiS as a sort of supplement to the actual workbooks because that *[the workbooks]* had the questions. I think if this *[SiS]* had questions I would use the questions like saying *"How would you construct a query to do x?"* and you can select the things *[gesticulates to suggest ticking boxes]*.

P6: That's what I think too.

P4: I think progress testing is, because you're collecting all this data anyway, it wouldn't hurt.

P6: Just for the user to learn.

R: Do you think from looking at the product as a whole, so everyone that manages it and everything, like I said earlier, I didn't really want the course administrator to have to input all these test cases. Do you think things could be automatic?

P6: It could be randomly generated.

P2: It could be. If you've got the ...

R: Its how the help bit *[auto-generated examples]* worked.

P6: Yeah, exactly if you output those queries you can ask something: *"how do you . . . "*.

P2: If you've already got all the information here you can just randomise a selection saying SELECT this, this and this *[random attributes]*. You could add specific things like display the super heroes who's alias is Star Boy etc. It could easily be randomised, you could just replace superheroes with cars.

P6: I really think you should have the option to update or write . . .

R: To do extra, like the other clauses?

P6: No, actually I want to add a superhero or I want to delete a superhero, this is how you do it.

R: Does anyone else agree with that. So, SiS only works with the SELECT statement, its only getting stuff out of databases. Do you feel like it should be expanded into . . .

P6: Maybe a different mode, this is the SELECT mode, when you begin have a . . . *[picker for the clauses]*

R: Do you think it would have a similar sort of setup? Maybe if you were creating a table you could have what your table will look like here *[in the results section]* or something?

P2: I did find that by the end of the year *[meaning module]*, I'd forgotten how to create tables and drop tables and edit tables and add things to tables.

P1: Yeah, I had to go back.

P2: Because we did it in the first week and then we just forgot about it and did SELECT statements for the next 4 weeks.

R: Obviously there is a reason for that, is that generally speaking you only build the database once.

P6: But still, you need to know how to do it.

R: Of course. Does anyone want to draw how it might look if you're creating a table.

P6: It should look like that *[SiS as it is]*. It should look exactly like that.

P1: The only bit that would change is the top left box so you'd say what you want the

columns to be or whatever and tick primary key etc.

P6: Instead of SELECT you would have CREATE, UPDATE, DELETE etc.

R: You think there should be options for all the different clauses.

P1: It would actually be easy.

P4: I think CREATE, I have seen something, a piece of software where you draw out the visualisation and you connect it up to MySQL or whatever and it converts what you've drawn into SQL.

R: Do you think that's useful, bearing in mind that the end goal is for people to be able to do this with text?

P4: I think the conversion to syntax is a good idea but definitely drawing it out, maybe after you've drawn it write the syntax and do a comparison between the two that way you can do a bit of progress testing.

P6: Basically you follow the same process so you don't have to learn things twice, you only learn it once.

R: I guess that's probably about it. Did you thing it flowed alright and was responsive?

P2: Apart from the alias thing *[typing causes the highlighting to flash as characters are entered].*

P6: It was really fast.

P1: Maybe, see that's hard because do you wait until the person has clicked off the alias before it changes or, sometimes you might think *"I sort of want it to change"* when you're typing in.

P2: You could press enter when it finishes.

P6: Could you just have it so the yellow stays on until you finish typing

R: So it doesn't flash?

P6: Yeah.

P1: Yeah, it extends out and then when you click off it, it fades.

R: Probably just my dodgy JavaScript skills there! I reckon that's about it, has anyone else got anything they want to add because this just about wraps up the end of the

study.

P1: I think its really good, really good software.

P4: I'd like to be part of the user test for next year *[when changes/improvements have been made]*.

R: OK. Thanks everyone for coming and thanks for helping me with my PhD!