Developing Technology to Improve Schedule Planning and Decision Making for Adolescents and Young Adults with Disabilities

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Full Transcript

INVESTIGATOR 1: So the overview for tonight, we just talked through consent forms. Ummm, I hit a little bit on the aims of the project the two main things to being one to get your honest feedback about how this technology fits as you see it, how you can see it working, what concerns you may have. The second aim being that we gather some footage and gather some actual uh feedback from you that we can use as we start to educate people about the technology. We, I do intend to leave a little bit of time at the end of the focus group so that if any of you would like to share a testimonial or some positive feedback we would be happy to gather that. Don't feel any pressure to say things positively for our video if you don't mean I'd like to really gather your honest feedback as well so both positive and critical are welcome.

So like I said we are gonna try for 75 minutes and then if you can stay for an extra 30 minutes and give a testimonial to Zach that is an option that we would be happy to have you do and if you would prefer to leave that is no problem at all.

So with that in mind, I am going to walk you through a case example and we are going to use this example to demonstrate the technology that Dr. [name] and I have been developing. So if you can picture Jane, a 16-year-old, who is a high school sophomore with a history of cerebral palsy and chronic breathing problems. Many of you may know that CP is also associated with things like attention problems and difficulty with planning, and problem solving. Our patient Jane has to wear braces on her legs, she needs help from one of her parents to put these on, she also has to do a medical treatment 3 times a day and this has to be spaced out in a meaningful way in order to help prevent respiratory disease. She has an OT she sees who works on her right hand. I didn't add it here but we can probably assume they are also working on things like, like, planning and problem solving and higher level cognition activities. And so this might be an example of how her day looks like.

Adolescent Activity List

Adolescent Activity list	How long does it take?	When can it start?	When can it end?	Constraints When must it happen?
Wake up	10 min	5:30 am	6:30 am	
Other/Snooze	10 min	5:30 am	7:30 am	can be done more than 1 time
Eat breakfast and take meds	30 min	5:30 am	7:30 am	Cant be missed or omitted b/c meds need to be taken with food
Get Dressed	15 min	5:30 am	7:30 am	requires assistance from parents for dressing and donning leg brace
Morning Medical care	30 min	5:30 am	7:30 am	Breathing cough assist program has to be done with parent
Shower	25 min	5:30am	11:30 pm	
School	30 min	7:30 am	4:00 pm	no flexibility
Afternoon Medical care	30 min	4:00 pm	6:00 pm	Required medical treatment Has to be complete at least 4 hours before evening medical treatment Parent needs to be available
Wear arm brace and do OT therapy program	30 min	5:30 am	10:00 pm	Needs help to put on and off so parent must be available Cant complete homework or play video games while on
Homework block 1	30 min	4:00 pm	11:00 pm	
Social Time/Online	1 hour	4:00 pm	11:00 pm	
Dinner	30 min	5:30 pm	11:00 pm	
Bed time routine	10 to 15 min	8:00 pm	11:00 pm	
Evening medical care	30 min	8:00 pm	11:00 pm	Required medical treatment Parent needs to be available Has to be completed at least 4 hours after afternoon treatment ended

She is waking up pretty early, part of that is because, you can see that she has things that have to get done in the morning. She has to do a medical care in the morning, she has to get her leg braces on; that takes time, she needs a little bit of help from her parents to get it done and she has to get to school. In the afternoon again there are some things that she can do on her own, and there are some things that I have listed over here that really specify she needs a parent to help her with them. So, she needs to do some therapy to work with her parent present; she needs her parent help around for her medical treatments and she has to get 2 done but she can't put them too close together. She has to have them at least 4 hours apart. SO there is a little bit of complexity, that comes in her day.

Jane also lives with a family and she doesn't live on her own. So she has a father, a mother, and a younger brother named Jake. Her father travels for work often so usually it is mom running the show after school during the week day. And her younger brother has a schedule that is a little bit different than hers. He gets home a little later and he also usually needs help during the day. So, Jane's mom's schedule looks equally busy, if not busier, and there are some tasks in here.

Parent activity schedule

Parent Activity list	How long does it take?	When can it start?	When can it end?	Constraints When must it happen?
Wake up	10 min	5:00 am	6:00 am	
Other/Snooze	10 min	5:30 am	7:30 am	can be done more than 1 time
Get ready	40 min	5:30 am	7:30 am	
Jane medical care Morning Medical care	30 min	5:30 am	7:30 am	A medical breathing treatment that has to be done at regular intervals throughout the day
Help Jane get dressed	15 min	5:30 am	7:30 am	
Work	30 min	8:00 am	4:30 pm	no flexibility
Jane's Afternoon Medical care	30 min	4:00 pm	6:00 pm	Required medical treatment Has to be complete at least 4 hours before evening medical treatment Parent needs to be available
Jane's OT program with arm brace	30 min	5:30 am	10:00 pm	Needs help to put on and off so parent must be available Cant complete homework or play video games while on
Prepare dinner	30 min	5:00pm	8:00 pm	
Dinner	60 min	5:30	8:00 pm	Mom leaves a full hour for dinner because of clean up
Little Brother Jake's homework help	30 min	4:30pm	8:00 pm	little brother gets home from school at 4:30 Little brother has to go to bed at 8:30 pm
Jane's Evening medical care	30 min	8:00pm	10:00 pm	Required medical treatment Parent needs to be available

46

47 You know she has to cook dinner, she has to help Jane and she also has to help Jake. And how does

48 that all fit together.

49

50 So the reason that we have laid out these schedules the way they are laid out, how long does it take,

51 when can it start, when can it end, and what constraints are there – is because that is actually what Dr.

52 [name] has taught our technology to know and to do. So what we have done is develop a technology

53 meant to help teenagers like Jane manage their complex health needs, manage their schedules and

54 make some of these choices independently. So the system, we have set up to know what Jane's day

55 looks like. It knows what are all the tasks that need to be completed, it knows what these constraints

56 are, what needs to happen with a parent, when does it need to happen. And what really want to zoom

57 in on today are 4 different features of this technology that we think are useful and that we hope will be

58 helpful and additive.

59

60   1) we have emphasized having teenagers be able to make their own choices the way they would

61   like to make them with the security that this technology won't let them "break" their schedule so

62   to speak. The technology knows what needs to get done.

2) The technology can also demonstrate the consequences of an early choice in the day and "show" what can happen later in the day for planning purposes.

3) And it can coordinate between multiple schedules so it can help align between parent and teenager choices.

4) And even allow parents or teenagers to make changes in a way that works for both schedules or can be adjusted in both schedules.

Those are the main features that we have been focusing on and I will just say that we focused on these because of feedback from earlier focus groups from earlier feedback from our patient groups.

Investigator 1: So I'm going to walk through a few demonstrations and [name]. [name] is going to be facilitating. Now the big warning is this is not a technology that's ready for market on its own. This is something that we hope would be embedded into an existing system. So you'll be able to give us the best feedback if you imagine that this works within a tool that you may already be working with, are aware of. You have not focused on things like where the where the go button would be. Here are the reminders that I would sound like I think I've actually hit on most of these as I've been talking, what we're gonna do is ask for volunteers as we do different demonstration. So each of you to do a little bit of interaction with the technology, as well as observe everybody else interacting. And after each demonstration, I'll pause to make sure that we can have a little bit of a discussion about it.

Please don't be offended if I cut you off and we're going to try and run through things and they want to get everybody out of time. So I'll try and be as quick as I can. As you're watching a technology and as you're thinking through these things, this is just some examples of questions that we're interested in hearing about.

"How this type of technology be helpful to your patients?"

"When can you see it being helpful?"

"What doesn't work about the technology?"

That that level of question - It's really going to be very helpful for us.

Any questions before we get started kind of playing with technology, right?

Investigator 1: In that case, does anybody want to go first and making some picks for Jane in her schedule?

96   Volunteer 1:   Why not?

97

98   Investigator 1: Thanks

99

100   Investigator 2: I'll go introduce stuff and - then I'll sit on this side so I'm able to I have to iPad here.

101   When we get to that person's situations where we use both of them, I can only project obviously one at

102   a time up here. This is an example of how our current interface. This gets passed around it's a

103   prototype be gentle with it because it is a prototype, built by graduate students. It's not, it could, could

104   break, I apologize in advance if it does. We can restart it up again.

105

106   So here are the various acts among of the various activities. And if you've seen Gantt charts, it's

107   almost kind of like a Gantt chart over to them to the right there. And as I, as I sweep across here, we

108   get to see all the various things that are happening later on in the day. On the right hand, left hand side

109   here, we're at 530 in the morning, as it says right up at that without their current times, 05:30 AM and

110   the choices that Jane is given, our waking up, getting out of bed or doing something else. This other

111   choice is always going to show up when there's a little time in the schedule where change chooses to

112   do something other than what's here, she's allowed to do that. In the gray areas here, it says this could

113   be last anywhere from five minutes to – 35 and we do things in 5 minute increments of five minutes to

114   35 minutes is what flexibility she hands.

115

116   For example, if I touch on wake up, you gotta be a little patient and its sluggish technology as we're

117   working out all the bugs. But I kept on, on wake up. And as it works its way through voluntary goes,

118   right? Wake Up is highlighted at the, at the top there and says, okay, well Jane could wake up. And

119   after that, then there are various other things. This homework one is highlighted with this. This one is

120   actually a little bit of a, of a little bit of a glitch in the system. But basically these up things that get

121   highlighted are things that are changed as a result of a particular choice. So that, for example, if we

122   choose other and we scroll to how long we want to do something otherwise.

123

124   Investigator 1: Actually I am going to pause you there, can we let Volunteer 1 pick this one?

125

126   Investigator 2: Let Volunteer 1 scroll I guess we can.

127

128   Volunteer 1: So with other can I choose what other will be?

129

130   Investigator 2: Other is whatever Jane wants it to be, right? She doesn't have to explain herself or

131   make it officially part of her schedule.

132

133   Volunteer 1: Okay.

134

135   Investigator 2: Alright. So you picked other for some amount of time and how much time did

136   you give it?

137

138   Volunteer 1: 15 minutes.

139

140   Investigator 2: Okay.

141

142   Investigator 1: Do you have an idea in your head about what she might do instead of wake up for 15?

143

144   Volunteer 2: Go back to sleep.

145

146   Investigator 2: Snooze button. So as a result of that right, everything gets shifted a little bit into the

147   future. Right, and so after that tentative choice, right, so we saw she could tentatively choose wake up

148   or she could choose other. When she could choose other when she's figured out what she wants to do.

149   Then there's a little button down here to confirm the activity.

150   Investigator 1: So Volunteer, now that you see that it's all yellow. That means the, if

151   you sleep for 15 where there's a lot of a lot of warning you schedule.

152

153   Volunteer 1: Okay.

154

155   Investigator 2: There's things that get shifted.

156

157   Investigator 1: So is Jane going to confirm that I am and definitely sleeping in today?

158

159   Volunteer 1: yes, let's confirm.

160

161   Investigator 2: Let me just show you one other thing. If we try to slide it so that it goes more

162   than 35 minutes. It pushes us back. It says "uhuh" you're not allowed to do anything. And if I select that

163   35 minutes in the morning, again, give it a chance to think about the consequences of this thing. There

Investigator 2(cont): it went. One of the things that happened is shower ends up disappearing here. So the way this schedule is made is that Jane has to shower in the morning or the evening. She's just push the snooze button so long, the morning shower just can't possibly happen. And so that's why shower in the evening now is highlighted. Because now instead of being no time at all because of it being no time at all, because you could have done it in the morning, now you're going to chew up time that you could have been doing something else.

Volunteer 2: And so when we started out and you had yellow on homework, was that a holdover from the night before when there was homework that she had chosen not to do?

Investigator 2: I am not sure why that is actually there, I apologize. I couldn't track down exactly what the glitch was for that homework.

Investigator 1: I would love to say that was our intention.

Volunteer 2: We into, well, I mean, that's great consequence for teenagers.

Investigator 2: Certainly things can carry over from, from the night before. If they, if they didn't get a particular thing done,

Volunteer 2: And it would let them make that choice?

Investigator 2: if, if the choice was allowed by the information entered into the system.

Volunteer 2: Cool.

Investigator 2: Just like they could choose to shower in the morning or the evening, they can also choose to do homework in the evening or the next morning kind of thing,

Volunteer 3: Or not.

Investigator 2: The system is built around saying these things are in here because they are things that do have to get done. And as we saw, if I tried to choose other that was snoozing too long, then it was not going to let me do that.

198 Volunteer 3: Now, let me piggyback on that. I like the yellow as "Hello!" this is what, this is

199 what's going to happen. Are you thinking about having a progression of colors, yellow, orange, red?

200

201 Investigator 2: We actually had that that earlier at one point and then got other feedback we got was

202 sort of…. yellow, orange, or red sort of indicates a bad right. Whereas just because you made a choice

203 that pinches something later on in the day, doesn't mean it's a bad thing. So we were pushed towards

204 less, less, less negative kinds,

205

206 Volunteer 2: cool.

207

208 Volunteer 3: less nagging, right.

209

210 Volunteer 1: Nice.

211

212 Investigator 1: Well and our focus with this idea has been that already there's a hard limit for something

213 that we would consider bad. Right? If say, because of the way your time works in the morning, a shower

214 would make you late to school. So we're not going to turn it red; we're just not going to offer it.

215

216 Investigator 2: In this case it allowed you to sleep in 35 minutes because of that. So let's keep

217 life a little simpler and let's just say Jane, today's gonna wake up. Okay, that choice, confirm that

218 activity. And again, this system takes a minute to say, okay, I'm processing that information. And of

219 course, waking up in this case is a, is a ten-minute activity. And so in a real system, people would be

220 doing stuff for ten minutes, but we're not going to be sitting here waiting ten minutes for life to proceed.

221 That's why there's this funny little button down here that allows me and simulation to say, all right, well

222 let's, let's assume that we're moving through this activity and move on to the next time that a decision

223 would be able to be made in this is kind of a setting.

224

225 Volunteer 4: I have a question about the other activity.

226 Investigator 2: Sure.

227

228 Volunteer 4: If she chooses an activity that was going to happen later in the day, like let's say she

229 chooses to wake up early, do homework, for 10 minutes, which won't happen, but would it then reduce

230 the homework allotment for later in the day?

231

232 Investigator 2: So it would not be smart enough to know, oh, this is, this activity is connected with daily.

233 Unless we explicitly said that like the morning shower and the evening shower are exclusive of each

234 other, only they can turn on the other. What would happen is she could go in and modify or remove the

235 activity that she now has accomplished earlier on and free that time up later on.

236

237 Volunteer 4: Okay. Okay.

238

239 Volunteer 2: Is there a block out so that - seriously, we aren't smart enough – so that someone can't

240 say - we'll just remove the activity. "Watch This! [delete]."

241

242 Investigator 2: So this system as we build it right now, the system is assuming compliance.

243

244 Volunteer 2: ewww, okay.

245

246 Investigator 2: So how to handle non-compliance is sort of going to be beyond this piece of technology,

247 right? It's more of a social issue than a technological, Right?

248

249 Volunteer 2: So my wheels are turning around. How much teaching Do I have to do around the

250 support? Like I'm making a list right….

251

252 Investigator 2: Or another step would be, would be to connect it to a message system, right. Parent

253 could, for example, say, if the adolescent removes any of these activities, I'm want a text message. So

254 that they would get a contact and be able to say "Why did you do that? Is it because you already took

255 care of that?" And what it would have to go sort of outside of the system to, to write to make those kinds

256 of decisions. The system just says, based on everything you've told me that needs to be done, I'm

257 going to give you all the advice that you need. I can't force you to take the rank gap.

258

259 Volunteer 2: Right.

260

261 Investigator 2: So this is this is that we're at a point where wakeup has a, has occurred. And this is one

262 of the things that we were striving for in her that we would want to developing in the technology itself. I

263 can hand it to someone else. So at this time point, right, there's all these choices you could make right

264 now. So that's kind of waking up and you always do this and this and this, right? If you wake up

265 hungry, you can tap breakfast.

266   Volunteer 3: Can I move it like scroll up?

267

268   Investigator 2: Just, just give it a second to turn green to tell us that the system is processed. I

269   apologize. Sometimes still a little slow.

270

271   Volunteer 3: Okay. No problem.

272

273   Investigator 2: So you do breakfast, everything has to shift a little not surprisingly. You can't do two

274   things at the same time. If you instead tapped on getting dressed and give that a try. So again, we

275   could have confirmed the activity with breakfast. We get, getting dressed, a chance to, to process

276   between the system. And one of the things that we will see once it finishes processing is that you can

277   get dressed and notice shower again went empty, and we've affected shower in the evening. The

278   system is built to say You have to shower before you get dressed in the morning. If you don't shower

279   before you get dressed. then a shower can't happen any time after you've gotten dressed. So you're

280   forcing yourself to have the shower in the evening.

281

282   Volunteer 3: So it recalibrates, you don't have to physically scroll. like it's you don't have to on the left

283   side.

284

285   Investigator 2: Nope nope, these are the only choices, right? So you can't do your homework

286   one or something like that at this point, because it's shown as basically everything. Here's this timeline,

287   it's moving along. Everything that's o, even with this timeline, is something that it could do.

288

289   Volunteer 3: So the yellow in the second column to the right that is showing that because

290   I chose dressing. The yellow is showing all the consequence areas.

291

292   Investigator 2: right. Yeah. It's just everything that was affected by those choices.

293

294   Investigator 1: Yes. And when they would have to happen. The other thing that I wanted to point out is

295   that you did something really nice there, which was first you clicked shower, sorry, first you clicked

296   breakfast and then you clicked dressing. But you haven't confirmed either one.

297

298   Volunteer 3: Ohhh, yeah yeah yeha.

299

300 Investigator 1: This is kind of like you're a teenager still lying in bed, going "I want to get up and eat."

301 And then, or maybe, I want to get dressed. Now you have just seen two options in how your morning,

302 could look.

303

304 Volunteer 3: Because they didn't press confirm they can do two options

305

306 Investigator 1: They haven't picked one yet.

307

308 Volunteer 2: And can the parents see this and be like, oh no honey? I'll put on shower and confirm.

309

310 Investigator 1: [laughing] conceivably yes.

311

312 Investigator 2: It's not built into the system. The parent will say yes, if it's in here the parents is saying

313 well. I'm giving you the flexibility to shower in the evening instead of in the morning. So I don't want to

314 be I don't want to be micromanaging you, right? If you wake up hungry today, you get a breakfast first.

315 Most days you get up and you get dressed and shower. But each day you might have woken up

316 worrying about something and your morning organization Time to get stuff together.

317

318 Volunteer 3: So the child is really actually on control and the parents are just monitoring, but

319 receiving potential remoted texts.

320

321 Investigator 1: For right now.

322

323 Investigator 2: In this case this was developed with the parent, right? They've decided here

324 are the activities that have to be done, right? If they do it themselves, they wouldn't have included

325 homework, right? So this has been agreed upon. This is the amount of time you want to set aside for

326 things. These are the ranges when things need to be done. These are the orderings. If they've must

327 occur, that have to happen.

328

329 Volunteer 3: Okay?

330

331 Investigator 2: After that, I'm letting you make your own choices.

332

333 Volunteer 3: And this is the external consequence for the parent not managing it.

334 Investigator 2: For how you make choices. Or for how you can put together a choice and then how that
335 choice influences the later part.

336

337 Investigator 1: So when [name], I'm sorry, [name], it's okay. Why don't you pick a line and actually
338 Confirm it?

339

340 Volunteer 3: Ok I'm going to choose that I'm hungry and I'm going to confirm it.

341

342 Investigator 2: And the system is going to think about it and I'm sorry.

343

344 Volunteer 2: I'm so I'm just wondering like did you think about giving them more concrete message
345 when one choice eliminates another, like if you choose to get dress, your shower is going to be in the
346 evening, giving them a more explicit, concrete way of seeing that rather than just it disappears.

347

348 Investigator 2: So it's just that, it's this highlighting that's occurring. So, you swipe that
349 way you'd want to scribe these kinds of things.

350

351 Volunteer 2: yes. Got it.

352

353 Investigator 2: So at this point, No. So again, we've been focusing largely on the machinery
354 behind this system that allows it to have this flexibility as, as heavy, said, less on the user interface and
355 exactly what the right way of telling somebody each of those things would be. Okay, again, the hope is
356 so the bigger picture this is this, this kind of more flexible technology of, uh, being able issues, things
357 instead of just saying every day is the same, I gotta do this and I do this, this, this, this was the goal of
358 important goal of our system to give this kind of a flexibility. We don't want to; we aren't in position to
359 build the whole system. The hope is to use things like video from this meeting and the technology to
360 put this on open source and have Microsoft should more or whomever, right, say, hey, I want to take, I
361 want to incorporate this into system that everybody already uses. But the trouble is you puts open-
362 source, something, GitHub or whatever, and there's huge numbers of things, nobody will ever notice it.
363 Yeah, part of why we want the video and things like that is to be able to get people to give testimony.
364 It'll get some sense as to what, how people would react to these kinds of editions.

365

366 Volunteer1: Is it like in testing somewhere? if people could just download then from open source?

367

368 Investigator 2: Yes, people can just download it and decide whether they wanted to incorporate that into
369 them versus me.

370

371 Volunteer 1: neat.

372

373 Investigator 1: It could conceivably be the kind of thing where your Alexa gets hooked up to yet. So if
374 this shower goes away. Alexa goes no shower today.

375

376 Volunteer 2: Yeah. Or no shower this evening.

377

378 Investigator 1: I think a more salient cue is feasible. For time I am going to ask somebody to pick the
379 next thing that we do and we'll select through a couple more.

380

381 Investigator 2: I'll just - tell me what you want.

382

383 Investigator 1: So you got a couple choices, up there.

384

385 Volunteer 1: Well I want to take a shower. And confirm

386

387 Investigator 2: Give it a chance to process. It will turn blue once it's ready to go. But it's showing you the
388 consequences. Now Go ahead, tap confirm.

389

390 Investigator 1: And so the other thing you can see, as we make choices, as your time is running less.
391 Tighter, later in the morning, more and more things are turning yellow, and so as they drop off, your
392 flexibility becomes less. Okay, so now you've eaten and were showered, right?

393

394 Investigator 2: And I'm gonna skip ahead to say, let's zoom through those 20 minutes or whatever that
395 the shower takes. We'll get some more choices as soon as it finishes going through. That there it goes
396 so down to getting dressed, morning med, et cetera. Maybe I'll work us through and while you move on
397 to some, some other stuff.

398

399 Investigator 1: So I think this is, ok. The this is our main goal of this demonstration is to sort of orient
400 you to the technology and how it's working. So anybody have other questions that have popped up?
401 You've been pretty good about asking this.

402   Volunteer 5: So this is pretty flexible with -- so we just have a generic school here. But if I really wanted

403   independence for a middle or high school or I want the class schedule in there.

404

405   Investigator 1: Yes. Since we've set this up partly as a little bit simplified so that we can get you

406   through a whole day. The constraint pieces. that I mentioned earlier are the important part. So let's

407   envision that you're working with a student in the school day and this may be something you do in

408   therapy is talk them through what happens first hour, what supplies do I need, when is my resource

409   hour.

410

411   Volunteer 5: Yes.

412

413   Volunteer 3 Yes.

414

415   Investigator 1: And so all of those, once you've decided on them could be built into the system, that

416   functioned at school. whether there would be the same system that functioned, that the parent wants to

417   know that something that could conceivably, we could be talking about a dyad that is you and your

418   student not necessarily parents at all.

419

420   Volunteer 3: cool.

421

422   Volunteer 5: which I kind of like for teenagers.

423

424   Investigator 1: So I chose shower. And then instead of getting dressed immediately after shower, they

425   went through their medical morning medical routine and now they're going to get dressed and we'll do

426   the organization time and all that. But… So I will hand the screen back to you, [name].

427

428   Investigator 2: You know, while he's updating the system before the next demonstration, I think one of

429   the first questions that I have is, is this. "How does this compare to other tools that you're already using

430   or that you are aware of out there?"

431

432   Volunteer 4: well, I really like the, I'm sorry, I really like the cascade effect and I don't know about that in

433   any other tools that I think I like the fact that when you make a choice, it affects all the choices

434   throughout the Day and it highlights it too that's very unique.

435

436   Volunteer 1: yeah

437

438   Volunteer 3: mm hmmm

439

440   Investigator 1: Okay.

441

442   Volunteer 5: Yeah I haven't seen that either I've seen schedules and, you know, task

443   breakdowns within a schedule, but not the cascade effect.

444

445   Volunteer 2: different organizers and different planners

446

447   Investigator 1: And when you say task, task organizers, are there other ones that let you flexibly

448   reorganize that task list. Or is it set once you set it?

449

450   Volunteer 2: Uh, not the user necessarily that I know of.

451

452   Volunteer 3: I know kids normally set alarms for themselves, et cetera,

453

454   Investigator 1: right

455

456   Volunteer 1: Yeah. I mean, there are homework planners that will tell you what's coming due, but not

457   taking into effect what your choice has done to everything else. So that's unique in this component,

458

459   Investigator 1: ok

460

461   Volunteer 4: I also think that once you set a schedule, the schedule was set, there is no further

462   modification of the tasks and when they occur.

463

464   Investigator 1: That's actually a concern that we heard loud and clear from our early focus groups,

465   which were done with teenagers - that they don't always want to do something in the same order every

466   day.

467

468   Volunteer 5: Or you don't have to do that for ten minutes. You can do something else for ten minutes,

469   but you know, you're still needing to do that.

470   Investigator 2: Right? So I guess on another level, is that something that you think would be of value to
471   your students or your teenagers?

472

473   Volunteer 5: Yes, flexibility, choice, but also consequences and long range thinking which
474   is difficult for this age group – middle school and high school

475

476   Volunteer 4: mmhmm.

477

478   Investigator 1: Ok, are there any concerns that you had about it or questions?

479

480   Volunteer 4: So I think that we've talked a lot about the consequences of something not occurring. I
481   feel like we haven't so much talked about the positives of something actually occurring. So we both
482   want to help these kids understand the consequences of choices, but also encourage them to make the
483   right choices. Like my teenager, I was talking about who did homework in the morning, I feel like there
484   should be something saying that there should be some kind of a "great job! You did something!" now
485   you get to hang out later in the day or something like a big thumbs up on the screen. Positive
486   reinforcement is huge.

487

488   Volunteer 3: that is a good one.

489

490   Investigator 1: that is a good one.

491

492   [volunteer 6 enters the session]

493

494   Volunteer 2: So I guess in my head, I think that's why I was making notes here about all the different
495   teaching pieces because there would be a ton of teaching pieces that would have to be built in that.
496   You wouldn't have to do some kind of reward system for, just for this teaching of this. In particular, I
497   think what concerns me is -- I think the color-coding would be fabulous for my high-functioning kids with
498   autism – this is gonna make total sense. For my kids that are higher functioning. But for higher
499   functioning but CI that's not going to work. It will take me forever to teach them the color system and
500   have it have meaning, but if the CI kids can have some auditory – then OK then we are done with that
501   side.

502

503   Volnteer3: Yeah.

504

505 Investigator 1: Okay.

506

507 Volunteer 4: Yeah, right, Along those lines.

508

509 Investigator 1: So the visual may not be helpful for all of the student groups.

510

511 Volunteer 2: Right for some but not for all of the students who are more concrete.

512

513 Volunteer 5: Hugely important.

514

515 Volunteer 4: Along those lines? This might be a little more on the UI side of things but pictures are also
516 going to be extremely helpful. Instead of having the kind of words.

517

518 Investigator 1: You ready for our next?

519

520 Investigator 2: Give me just a few

521

522 Volunteer 4: So it seemed like some of the things in the morning there were more crucial than other
523 things in the morning, but it seemed that they all had the same level of constraint. Organization Time in
524 the morning, not necessarily crucial. Doing your medical things in the morning, very crucial. Is there a
525 way to delineate those importance factors? Could you pull them? So could you make it so one can't
526 get deleted?

527

528 Investigator 1: So not at this stage. It is something that we have discussed at different points is this
529 idea of weighting some activities would have, higher value than others and that they could maybe set
530 up in a way that [name] may be better able to comment on this.

531

532 Investigator 2: So as we mentioned before, there might be things you could have certain things that
533 you can't delete, things from the schedule. Other things where you can shorten but not shorten to much
534 or take out. All of that would just need to be put into place ahead of time. So if somebody would have
535 had to have negotiated between the caregiver, the parent, the adolescent, and perhaps a medical
536 professional, right? What are the priorities? What are the allowable parameters that you're allowed to
537 adjust things?

538   Volunteer 4: Sure.

539

540   Investigator 2; Again, the way that we've got it here is if it's in there, you gotta do it. So saying one thing

541   is more important than another. it, if it's in here, it's your right, it's treated is just as important because it

542   is not a choice, right? If it's, if it's in there, you do have to spend ten minutes get your backpack ready

543   for school or whatever.

544

545   Volunteer 4: Sure. I guess I'm confused about like the shower example because shower was in the

546   morning unless it wasn't in the morning and then it was in the evening. But you can't do that

547   with your medical routine. That has to happen in the morning for sure.

548

549   Investigator 2: So but the shower is a very special case that we've putting onto here.

550

551   Volunteer 4: Okay?

552

553   Investigator 2: To say these two things are related to each other where they are exclusive, you can

554   only get one or the other.

555

556   Volunteer 4: ohh got it. Ok.

557

558   Volunteer 3: and you have to make a choice.

559

560   Investigator 2: So by default, but things that are put in here say they can't occur at the same and You

561   can't do two things at once. But other than that, and I'll give you an earliest and the latest that it could

562   happen and how much time to set aside. Those are the only pre-built constraints we can putting things

563   in fact, things have to be simultaneous with them to dinner. Has to be everyone at the same time, right?

564   So instead of non-concurrent, say they must be concurrent with each other. Ordering constraints that

565   showering has to happen before dressing. Things like preparing dinner has to happen before eating

566   dinner and things like that.

567

568   Volunteer 4: Okay

569

570   Investigator 1: So another one that's going, we're just glossing over short time because we're going to

571   move into a demonstration that's in the afternoon – is school and work. So those are both completely

572 Investigator 1 (cont): inflexible choices, but they have very high value. And in fact, most of what is set

573 up in the morning, in the afternoon, is meant to preserve everybody getting to school or work on time.

574 So I think that's another way you could address an absolute within the schedule is to just say – this one

575 thing – this breathing treatment always happens from 8:00-8:30 with no ifs, ands or buts. And now

576 would have shaken up the morning in a whole other kind of way.

577

578 Investigator 2: but absolutely, yeah, we'll see an example of a hard, hard wired thing that has to

579 happen. But actually from the adolescence perspective that in the second scenario will show you the

580 adolescent is we get to the very last version says -- All my friends are on social media from eight to

581 09:00 PM. I gotta be online at that point and we can put that in. And now everything has to work

582 around that.

583

584 So here we are after school that is over. So the next thing to do is, is to go home. But we have this

585 other option again. Okay? And so the adolescent and say, well, my friends after school or are hanging

586 out doing something or whatever. One of the things that motivated us to work on this project is that

587 sometimes our target population, the adolescents, would be worried about saying yes to things that

588 enrich their social lives because they weren't sure whether it would fit with everything else that wasn't

589 on the schedule. I'm always I always go home and I do my homework and I had my medical stuff and

590 then I just walk and walk and then we'd have dinner. And that's the pattern in my mind. So can I say

591 yes if my friends today say you want to go out and we can get burgers or something after, after school.

592 So again, we, we could add a specific activity that says burgers or whatever.

593

594 But since this is the time that it's occurring, just say, Well, but I really like to do is something else, right?

595 And I don't want to spend an hour going off with my friends and doing something else. Now before that,

596 again the model was to go home, do homework and medical treatment to more homework, and then

597 have some supper right after this other choice. Once it gets processed through lots of effects and

598 spending an extra hour before going home, one of which again, point taken, well taken, we know this is

599 a complex interface. We can see this basically – homework2 - to now is going to have to happen after

600 supper which as far as the schedule is concerned, there's nothing wrong with that. But if the

601 adolescent sort of says, well, every day I go home and I have these 2 blocks of homework and I do my

602 medical treatment in between those two things, --this is the way that it goes. The goal of this was to

603 say, well, it doesn't have to be that way, right? As long as you're willing to accept the fact that you're

604 used to not having to do homework after dinner. You got it all done before dinner. --Tonight you're

605 going to have to do homework after dinner

606 Investigator 2(cont): That allows you to do stuff, have fun with your friends after school. Alright, so

607 again, to give that, give that flexibility to the adolescent to say, okay, I could make that choice and I do

608 have to pay the piper later or night after supper. I'll have to hit the books again, but maybe that's okay.

609 So if we confirm the activity than in the rest of our evening is much more constrained, right?

610

611 Then we're doing our medical activity in the afternoon is going to be pushed to obviously to a later time

612 which also pushes our evening medical activity because there has to be at least four hours that lapse

613 between when I do the first and when I do the second treatment. Now we have, this doesn't show up

614 as an activity, but this data with an hour of doing something else. And now if I advanced to saying, OK,

615 well I have done that now at this point, like going home is the only choice in after I get home, you can

616 sort of see how it's going to stagger, push some of the buttons. But in the interest of time, we will

617 necessarily go right, I'll go home. And really the only thing I'll be able to do after I go home is to do my

618 medical treatment because if I put off any longer than I can't stay up past 11 o'clock at night, so before

619 our gap between them. So that will be my only choice. And then I can do homework. And then I had

620 dinner, and then I've had to do some more homework after dinner, right? The rest of the day can play

621 out.

622

623 Things just shuffled around a little bit. But again, the goal is to be able to allow this adolescent who's

624 learning to become more independent and wants to say yes to social outlets, right? Make life richer to

625 be able to say, yeah, my, my machine tells me I can say yes to this and it's telling me what the

626 consequences are going to be and I'm willing to live with those consequences. So yes, rather than

627 having some spare time tonight to read a book, I'm gonna use my spare time now and everything is still

628 going to be able to go.

629

630 Volunteer 3: Okay.

631

632 Investigator 2: So again, I can I could, could keep us moving forward maybe unless it's time to?

633

634 Investigator 1: Sure. I'd say let's pause and I will get any comments from you now before we move on

635 to the paired feature which is a thing I talked about in the beginning.

636

637 Volunteer 4: I have a comment about the other activity about that other activity that we just added I

638 think that clinically, if I we are talking about the consequences of choosing to go for hamburgers after

639 school, I would want that hamburger activity to show up on the schedule. And I apologize because I

640 Volunteer 4 (cont): am becoming a little UI again I guess – but clinically I think it would be important for
641 me to say all of these things shifted because you ate hamburgers and it is not represented on the
642 schedule as it looks right to my face right now.
643
644 Investigator 1: Sure, right, right.
645
646 Investigator 2: And that that would be an easy thing to put into the system. They choose Other and
647 then you can choose to name what the other is and it would put it in for you.
648
649 Volunteer 4: Right.
650
651 Investigator 1: And that's something that could easily be hardwired feature?
652
653 Volunteer 4: Yeah. Yeah.
654
655 Volunteer 3: Or and also in that second column again to the right, could then once the time changes, I
656 know there's some activity that overlapping like homework 1, homework 2, OT therapy and dinner. But
657 could it sort of reorganize the second column to sequence, to reorder.
658
659 Investigator 2: Yeah, yeah, I think the challenge I'm, you'll see when I, when I go to adding an activity is
660 it's a little hard for us to figure out the order in which - homework 1 - we have homework 1 says it has
661 to come before homework 2 and various things. Dinner has to come before your bed routine and things
662 like that. But some of these other, like OT therapy, has a really wide range. And so you put it early
663 because it could happen earlier? and do you out it later 'because you could do it later? And so it's
664 really tough - because this isn't a regular, a typical calendar schedule that says you do this, this, this
665 this in that order.
666
667 Volunteer 3: Yeah.
668
669 Investigator 2: Right. Then it's harder to figure out the order in which to line these things up.
670
671 Volunteer 3: So it is more like these are the activities that have to happen, these are the options for the
672 time when they can happen, but they have to happen.
673

674   Investigator 1: And the technology really comes in, in the color that helps show the blocks. So it is

675   getting used to this idea that we know our choice is bounded by grey lines around it.

676

677   Volunteer 3: Yeah it's a range.

678

679   Investigator 1: And there's, right, these things are, are aligned because there's no reason to one in one

680   place or another benefit if you pick this one and this one has to slide down because you can't do two

681   things at once, right?

682

683   Volunteer 5: Are we tied to military?

684

685   Investigator 1: No.

686

687   Volunteer 2: It's just a cognitive issue. Is, is there? I - So the minute you made change, I love this

688   consequence thing. But when that entire block of the yellow popped out – 5 of my kids with autism, just

689   had a meltdown, right?

690

691   Investigator 2: Mmmm.

692

693   Volunteer 2: Like every single activity.

694

695   Investigator 2: Sure.

696

697   Volunteer 2: Is there a way to cascade them? Okay, now I'm going to plan this when, oh, look, now I've

698   got it, or do we have to get the whole block of yellow one time?

699

700   Investigator 2: Well, all of them are affected so you have too…

701

702   Volunteer 2: I know, I know, but they would have just FALLEN to the floor. [laughing] I am just thinking

703   about training the student which is a hard thing to do and so saying these are all options within the

704   timeframe – and I know this is going to blow his (the students) mind.

705

706   Investigator 1: Right. yes, it may be that there are some, you know, and I think this is something that

707   we've talked a lot about. There may be sort of a lower bound at which this Helpful tool. Is part of what

708   I'm hearing from you, that there are some people that would be completely overwhelmed by this choice.

709   Volunteer 3: But those people need it.

710

711   Volunteer 2: Yea TOTALLY. Really need it. And it's going to work very differently for my kids that are

712   transitioning with autism than it is for kids that are transitioning that are high or moderate CI?

713

714   [general volunteer agreement]

715

716   Investigator 1: Sure, CI is very different.

717

718   Volunteer 2: For CI I need more parameters in there, but they both need this kind of tool. This is

719   amazing, but I need it to achieve that.

720

721   Volunteer 1: Is it possible to show limited, I know, the idea is to give them the end choices. But instead

722   of showing everything for 13 hours to 24 hours can be adjusted to show 2 hour blocks because that

723   might be more manageable. As opposed to 4 hour blocks.

724

725   Investigator 1: Well that would be the choice that whoever was setting it up right there. You may choose

726   to focus only on a night routine or something.

727

728   Investigator 2: when we first built the interface, we tried to fit the whole thing all on one screen.

729   [laughing] and it was tiny and it was really confusing. Being able to stroll was when we were able to

730   make a window - we can certainly make it larger and but then you have to scroll farther to see things

731   for some people.

732

733   Volunteer 3: You would lose your maneuverability.

734

735   Investigator 2: yea, you lose the bigger picture. So there's always going to be, always going to be

736   trade-offs, right? Just like there's -- I set this up by saying, --Well, I'll typically Jane goes home and

737   does her homework, does a block of homework, then does the medical treatment. Then there's -

738   another block of homework. We could have it so that if there was a change to the change to go get

739   burgers meant that something that usually happens at a time is way in a way different, where we'd have

740   to define "way different", (how big a difference?) -- Maybe we can just highlight those things. So yes,

741   you're still going to go home and do homework after this, but your evening - your other homework is

742   going to have to go after dinner - And that's very different from what usually happens. So that's what I'm

743   Investigator 2 (cont): going to highlight. You just have to have some basis for deciding what's, what's

744   important and what's not. And the system doesn't know those kinds of things unless you feed it that

745   information.

746

747   Investigator 1: So for time we're going to have to move forward to the other feature of our technology -

748   which is the paired schedules.

749

750   Volunteer 5: So I assume that mom may decide when dinner is?

751

752   Investigator 1: So she might right? And as you will notice, mom's schedule actually has the most

753   flexibility in our system. And you're right, she could probably lock that in but you can see that they line

754   up close, but they don't line up exactly. So I circle homework because homework is something they

755   could start at 4:00, even though mom doesn't get home until 4:30 - that's probably her pick for what

756   Jane does between 4:00- 430, right? She wants her getting homework done as much as possible. So

757   that at 430 when she's home, they can do the medical treatment together and then they're going to do

758   the other medical treatment at 8:30 and everybody's night goes swimmingly. But that is not what the

759   teenager's choice, that's mom's choice. So really we want to think about what are the other possible

760   ways that this can play out and still fit?

761

762   And so that's, you know, you guys have been very flexible with volunteers will probably just continue to

763   do group choice. You'll see there's again, a little bit of funkiness here between the two iPads. So the

764   way we're simulating to people's schedules is that you're going to have two different iPads that respond

765   to one another because again, we're fast-forwarding through the afternoon, there's still going to be this

766   kind of forced choice situation that happens. I guess we kind of by default have sort of a teenager side

767   of the table and a parent side of the table

768

769   [volunteers laughing]

770

771   Investigator 2: This is a simplified portion of the day. So here's the adolescent's schedules, we still

772   have homework in two blocks of time and dinner and social time, afternoon medical treatment and

773   evening medical treatment that have before our gap that has to be between them. And then let me see

774 Investigator 2(cont): if I can change it without too much trouble? Here's the parent schedule that has

775 their afternoon of work and then they have afternoon med and evening med and evening med – the P

776 annotation I just used for the parent. And so those have to happen at the same time as the adolescent

777 does those, those choices. Same thing with the dinner has to be at the same time, the adolescent

778 makes that choice. So if I move the - I'm going to move the adolescent through school. You're not

779 going to particularly see that because I got the parent's schedule one on here next and maybe I'll

780 change it in a second. So now the parent is moved forward where the adolescent has made their

781 choice. And now the parent is able to make their choice because they're times were aligned at different

782 points. The adolescent's afternoon started at noon, so the parent has no choice. Parent is still at work.

783 And I click on that one as we saw before and confirm the activity. And now we move on.

784

785 And if I advance the system time and move forward, what ends up happening is the adolescent gets

786 home from school half hour before the parent finishes work. So if I go back to the adolescence

787 schedule here. Oops, I thought I did.

788

789 So the adolescent has a choice, the adolescent could do something other than homework for 30

790 minutes or they could get homework right now. If they get started on their homework, the homework

791 that block of time allocated for the homework is an hour. And so their afternoon medical activity is going

792 to have to move forward. It would have to start therefore at 430 if they do homework for now. So if I

793 pick homework and I confirm that activity, right. It's slides that afternoon medical activity until later. But

794 if I go and look at the at the parent's schedule and, bear with me as I jump back and forth here then the

795 parent's schedule also has an afternoon medical activity shifted to when it has to be from 430 to 530.

796 So even though the adolescent made a choice and now it's reflected in the parent's schedule. So the

797 parent hasn't finished work yet, but already knows that they're not going to get home and immediately

798 be doing the afternoon medical activity with that with time instead, they could either help the brother

799 with homework or they could start preparing dinner, right now, the prepare dinner doesn't is allowed to

800 have happen any time before. So it would be a cold dinner, I guess at that point that they would be

801 having.

802

803 Investigator 2: So in this case, the advance – advance our time forward. -So the parent has a choice

804 between the prepare dinner or help the brother or something else for half an hour. The most they can

805 do something else spread is for half an hour because it gotta be ready to do the medical treatment

806 Investigator 2(cont): because we've locked ourselves into that. There's just this an opportunity to you

807 right then and there to do it because it has to be at least four hours before the evening activity.

808 Volunteer 3: So in real time teens working on homework, she burns out after 30 minutes and says, I'm

809 done, I can't do anymore. Can that be accommodated to say, Okay, I've only done it for 30 minutes. I'll

810 tap the other 30 minutes on to another time.

811

812 Investigator 2: So in the current interface, that would not be an easy thing to do.

813

814 Volunteer 3: Okay?

815

816 Investigator 2: The way is you see, we, we sort of have done it is we say, Well, Jane tends to burn out

817 after an hour. So instead of having two hours of homework and then having her sort of burnout at

818 various times, we made two blocks of homework and say should give you an hour and then another

819 hour. If she could burn out after a half-hour, we would instead have half-hour blocks of homework that

820 she could think she could do.

821

822 Volunteer 3: Okay. so based on what you think the student or the child would be able to handle right.

823

824 Investigator 1: That would that would be the most straightforward way of doing it right that after half-

825 hour than they're given a choice. Saying do you want to do another half-hour now, or do you want to do

826 something else? That's on the schedule.

827

828 Investigator 1: But your rate for the, for the day that your student who typically can work for an hour. But

829 30 minutes into this particular homework –

830

831 Volunteer2: Their bawling, their tantrumming because, my God, I can't go any further…

832

833 Investigator 1: Or where something happy, happens - a neighbor stops by and you want to visit for a

834 little bit but you didn't finish that second half-hour?

835

836 Volunteer 2: Yeah, I think so.

837

838 Investigator 2: So then the rest of the day kind of can play out as we would expect. But after Yes, I had

839 the parent decide to help the brother the homework. This little exclamation point shows up this part of

840 our interfaces we're simulating time forward. It just says you're not allowed to make a choice because

841 there's simultaneous choices. And in this case, the adolescent gets to make their choice first. And so if

842 Investigator 2(cont): the adolescent chooses afternoon medical treatment and I just made that choice

843 on this one. Now, the parents tab that says your only choice right now is to do afternoon medical

844 treatment because you do it at the same time as, your teenager. So we can confirm that activity and

845 advance on. And now the adolescent and the parent are at it whatever 530 in the afternoon in the

846 parent can prepare dinner and then they could they could eat dinner or they going to do something for

847 an hour because the adolescent could say, well, I don't want to eat dinner soon and I want to work on

848 homework first and have dinner later. And so again, flexibility as to how these various things happen

849

850 Investigator 1: Or this to bring up your earlier comment, this is one moment where mom might say I

851 started preparing and then before anybody else hits the button, she hits dinner, everybody. Hmm, so

852 there, in that place where there's a simultaneous choice option, either person can take control.

853

854 Investigator 2: right now we've got a built-in for, for the adolescent being the one that gets to go first

855 just because we had to pick something here, but yes we could get past the first choice - when in doubt

856 for this, for this system that we were building, we were focusing on giving adolescence as much choice

857 as possible. So we were defaulting to that.

858

859 Investigator 1: So again for time reasons, I'm going to have [name] start the last demonstration that we

860 have. But this is again, that other side - Have you see other coordinated schedules like this out there in

861 tools that you already?

862

863 Volunteer 1: I mean, just like scheduling into Outlook or something to meetings but…

864

865 Investigator 1: Sure where you can send a calendar appointment.

866

867 Volunteer 4: But again, nothing that affects other calendars. this way - not that I can think of.

868

869 Volunteer 2: yeah, no.

870

871 Investigator 1: Okay. Are there - what ways they could you see this being applied? Can you see this

872 being applied to your patient population or with your families?

873

874 Volunteer 3: Yes, especially the example of a teenager – or - just it takes away a lot of arguments and

875 a lot of nagging and a lot of those kind of things, that when we see this all the time -- go check your

876   Volunteer 3 (Cont): schedule, see what that says. Because I'm not going to tell you what you have to
877   do and it's just a paper schedule, but, you know, it's time can't bend it too much, right?
878
879   Volunteer 4: I also like how it forces only one person to choose at certain points of time, like now it's
880   dinnertime, MOM chose dinnertime. Teenager does not have a choice for dinner. But teenager does
881   have a choice for like what they do for that half hour school. Because moms not home. That seemed
882   very real to me and very flexible. And like the teacher has a choice in some things, which, you know, is
883   true.
884
885   Volunteer 1: I know from a school standpoint, I know this is extrapolating it to something that it doesn't
886   sound like you're ready to go to yet but in high school and middle school, we had an hour for our
887   caseload kids who get time work on assignments. And one of our big issues is prioritizing. And if we
888   could use this type of idea to say, okay, gonna spend 15 minutes on English, 20 minutes on world
889   history. And if you don't do that, I could see where that would be a really good learning tool to say --
890   This is what happens when you don't -- when you get it done, everything gets done if you don't follow
891   this -- consequences. So I can see that really…
892
893   Volunteer 2: if we kind of -- Actually, if we could get it to data track too, and we might have to do it by
894   hand. But what happens a lot with our kids like this that are really executive function is the parent
895   comes in and says, well, how did this happen? But if I have data from all of this is how the scheduling
896   went, right. Because our kids should have the same opportunity as other teenagers choose to fail.
897
898   Investigator 1: Sure.
899
900   Volunteer 2: Right? You could make that choice if I can data track it and say, Well, so, you know, you
901   get this many choices and then you didn't do it that many days. And now you have a D on the test.
902
903   Investigator 1: Sure.
904
905   Volunteer 2: Because this is how this went.
906
907   Investigator 1: So you may be setting it up knowing that they are not gonna complete these things, or ?
908

909   Volunteer 2: how do you build autonomy as a teenager? But, but so many of our kids really do need the

910   visual. And then this is a great talking tool back at the table. Well, this is exactly how it happened.

911   Investigator 1: And the coordinated features is, something that you said, you could absolutely data

912   track, right? you'd be able to see.

913

914   Volunteer 2: Yeah,

915

916   Investigator 1: They say they're working on their math, but I can make a note here that says, I see them

917

918   Volunteer 2: Right that they are going here and there and playing a game.

919

920   Investigator 1: Yeah. I mean, I was going to say talking with their friends. But sure.

921

922   Volunteer 3: I know your intent was more to think of medical patients, but this works for any kid we have

923   that is getting extra services.

924

925   Investigator 1: Well, that's actually another question that we have. It's nice to hear this. So this goes

926   beyond somebody having to balance medical care.

927

928   Multiple volunteers: Oh yeah, yeah.

929

930   Volunteer 1: Schedule is huge. Any kid that we have with ADHD?

931

932   Investigator 1: Okay.

933

934   Volunteer 3: Yeah. Any student I'm thinking with any kind of short term, or processing speed,

935   memory issues.

936

937   Volunteer 4: Executive functioning, issues.

938

939   Volunteer 3: This need it falls into at all those categories. There's a definite application.

940

941 Volunteer 2: That's actually why I was asking more about the very specific scheduling because it's
942 really --and that's what [name] was asking as well. Our kids have difficulty time managing in 20 minute
943 segments, if I can play the heck out of that. Sure!

944

945 Volunteer 6: Yeah.

946

947 Volunteer 2: I mean; it just takes all the adults out of life management to a point.

948

949 Volunteer 6: And if we teach the do the parents to use it as well. Because really we're trying
950 to improve autonomy. And too many times parents are the ones having to exert, Yeah, this is what you
951 need to do. And that kids don't learn that piece.

952

953 Investigator 1: This might actually teach parent autonomy as well.

954

955 Volunteer 6: Yeah, that would be a good thing.

956

957 Investigator 1: Let's move on to the last piece of the technology to show you. And this one, for time
958 [name] has been walking us through a few things. This last piece is going to address that question that
959 came up earlier about adding or modifying or changing the day.

960

961 Investigator 2: So - back to our afternoon within let's say for the parent starts or afternoon activities,
962 their afternoon work schedule, they realize, Oh, I got to participate in a teleconference from home
963 tonight. And so I can click on add an activity. And the activity they're going to add is teleconference.
964 And the teleconference is going to take an hour saying - right – hey why do you keep going to their -
965 stop It - I'd rather it shows it better - So give me a second to fight it a little bit. There.

966

967 OK after, after time. So let's say it's going to have, have to start after 7 PM and it's going to have to
968 finish at 8PM. So there's no flexibility. It's an hour Telecon because it's work stuff, 7:00 to 08:00 PM.
969 And so I click on finish and it adds it in again because there's no good sense in built into the system as
970 to where things show up in this vertical bar. And you see it's very, at the very top there. And if I swipe
971 over there it is between 7:00 and 8:00 PM. But a consequence of that, of course, is that the dinner
972 used to be able to happen anywhere from 5:30 all the way to 8:00 PM. And now Dinner is much more
973 truncated as to, as to what could happen for that choice.

974

975 Investigator 2(cont): So I'm going to make a choice then as a parent going forward. And I'm gonna see
976 if I can get us back to the adolescence schedule and after I advance us time. So the adolescents
977 schedule is here. So of course, dinner for the adolescent has also been truncated. Can't happen after
978 seven o'clock at night, but even more so remember you said it before? It was when that kid got home,
979 she could do something else for half an hour or whatever. That choice is gone because dinner has to
980 happen earlier. Now you have to get started on homework right away because we have to budget
981 homework and then the afternoon medical activity all within all before dinner time. So this is a case
982 where that the parent says, No, I've got some constraint. And it's slightly different from the adolescent,
983 Jane saying it's after school, I want to go out with Burgers with friends cuz that's happening right now.
984 This is, I can anticipate this additional activity later on. And that has upstream consequences that are
985 not only on my schedule but on my, my childhood schedule. And so it's reflected here.
986
987 Jane in this case doesn't know why she's not given a choice of something else. But based on the you
988 know, again, assuming compliance, she says, well, I'm not given a choice. I gotta do it. Now that that at
989 least makes life more palatable in the, in the family home as a result of that. That's an example of this
990 of a more dynamically we could add activities like the burger activity in this same sense - it typically
991 doesn't in our model - but maybe there are other psychological reasons why - in our model, if it's the
992 immediate thing you're gonna do, it didn't make sense to add an activity for right now if you could just
993 choose "Other" and just fill in whatever blank you wanted for it. But in this case, you're adding, adding
994 an activity for the future. And that's important to backfill with what the consequences of that.
995
996 Volunteer 4: Sure.
997
998 Investigator 1: I think the other thing that we haven't highlighted in advance but shows up here is - if
999 the adolescent has a hard wired time- and that is something that was predetermined – they said that at
1000 night all my friends are online and That's the most important thing to me. I don't care about getting
1001 homework done but I do care about that, so that's protected here. So the one thing that they would
1002 know because this would have been talked about is - if you do your homework right now, you can be
1003 confident that online time is protected. That might be a strategic choice that was made. And if you find a
1004 failure – eh - You said you did homework – but the homework's not done - there is potentially some re-
1005 org that could happen, it doesn't show up well on the interface because we're assuming compliance.
1006 But those are the kind of, options.
1007
1008 Volunteer 6: It's nice if that's one of the later activities.

1009   Investigator 1: So yes, it was convenient for us too.

1010

1011   Volunteer 2: It's the adult that can add and remove activities or either

1012

1013   Investigator 1: In the system now it is anybody could add or remove

1014

1015   Investigator 2: Yep.

1016

1017   Volunteer 2: Yeah, I love that. Did you teach the computer that language? What it said to if this is a
1018   legal activity, this will go.

1019

1020   Investigator 2: we put that ….

1021

1022   Volunteer 2: This is great verbiage for kids with autism. If this is legal - it will happen. It is perfect. So I
1023   hope it also says if it isn't legal because they really totally understate it.

1024

1025   Investigator 1: It was written for engineers but…

1026

1027   Volunteer 2: They will totally understand that.

1028

1029   Volunteer 6:   Yeah, it's legal.

1030

1031   Investigator 1: Well, we're hoping in the design, that when a teenager is using this that they can have
1032   just that confidence – if this is legal then it will go.

1033

1034   Volunteer 6: Yeah go for it. Yeah, yeah.

1035

1036   Investigator 2: If it's going to break something you can't add this in. And right now the way we got it is
1037   just if you enter it and you get back the same schedule you had before then, it didn't it didn't take it
1038   wasn't allowable. We've certainly have sketched out design strategies for okay, well, if it, if it can't fit
1039   and you want to fit it in, how does this system tell -you - other things you could do to make it fit like
1040   giving up on the social time. That gets again into priorities, right? Who gets to decide that? What, what
1041   things can give or how much can you shrink work by half-hour but not buying a full hour, or whatever.
1042   That would have to be, information that would be put into the system. But this kind of system then could

1043   run through a few different choices of combinations of things and present a few choices to the

1044   adolescent saying, if you really want to do this, then here are ways you could make that work.

1045   Volunteer 6: Yeah, that would be excellent.

1046

1047   Investigator 2: Yeah – they can give up on this or we give up on this or do this a little less or whatever,

1048   or having stay up later at night or whatever.

1049

1050   Volunteer 3: Back to something that [name] said, can you do weighted activities like how on Google

1051   calendar you can set reminders so that you get a text methods in case somebody's not monitoring

1052   schedule all the time. For like really important activities such as – meds.

1053

1054   Investigator 2: so again, in this, in this particular situation, no, what we got is, is basically when you

1055   finish an activity, then you would refer to this again and it will tell you, here are your choices, right?

1056   Because you're, the goal is not to sort of have you live in an unnecessary pattern of – I always do these

1057   things and whoops, I overlooked something. It's the system that is, every, every time I finish

1058   something, I can go to the system and find out what is allowing me to do right now to …

1059

1060   Volunteer 3: So parents are probably using this system with something else for many important

1061   activities such as like, meds.

1062

1063   Investigator 2: Right. Um.

1064

1065   Volunteer 3: Like a med reminder.

1066

1067   Investigator 2: Sure. You would probably want to have a separate meds reminder. Again, this is not

1068   intended to replace all the stuff that's out there, right? It's to augment with the kind of flexibility that

1069   we're talking about. Again, our hope is, is that we can convince producers, commercial products

1070   producers, that this would be good additional technology to incorporate in their systems. So that instead

1071   of a parent laying down and saying, "Here's exactly how your day is going to go." And then the

1072   adolescent rebelling, right? The parents say "well here all the things that have to get done and all the

1073   constraints." And the system is going to tell you what you can choose to do at any given time. And as

1074   long as it all gets done, I'm fine with that.

1075

1076   Volunteer 3: That's good. Ok.

1077   Volunteer 2: Yeah. And actually, I know one of your questions was about transition. So it, it, if we could

1078   teach this at high school, this is exactly, exactly what they asked them to do when they do a young

1079   adult program. So they sit down and they have to plan their day. Okay. What are you doing today?

1080   They plan their day. Dah, dah, dah, dah, dah, dah, dah. So they put it, they could put it in and execute

1081   their day. That's what they would do at the end adult program.

1082

1083   Investigator 1: Oh wow.

1084

1085   Volunteer 2: That's how their day starts.

1086

1087   Investigator 1: So your saying that this could be the kind of place - a place to put their plan that would

1088   help them.

1089

1090   Volunteer 2: Oh, yeah, yeah.

1091

1092   Volunteer 6: Yeah. If it's got all that activity flexibility and I mean, they do and they do everything.

1093   Okay.

1094

1095   We're going shopping. Okay. We have to make a dentist appointment and move their day and execute.

1096   So this would be- if they already sort of knew the routine, this would be….

1097

1098   Investigator 2: Now one thing that the system assumes right now is that then they can estimate the

1099   amount of time it would take to do something. But is that something that you see as feasible for that

1100   kind of transition planning, or for your populations?

1101

1102   Volunteer 2: NO

1103

1104   Volunteer 6: For higher functioning it probably stays within that, but I have a lot of students and they're

1105   young adults, - so I am that I am adult there.

1106

1107   Volunteer 6: And some of them have a very, very, very, very, very, very long process speed. So for

1108   that to make a decision, it might be like 15 minutes of trying to figure out how we're going shopping.

1109   Push the button – long pause – push the button. So like even knowing that it takes them that long to

1110   push the button so when they go – going shopping in and of itself, it's going to take 2.5 hours longer or

1111 Investigator 2(cont): get it – cuz you go shopping, you get on the bus, you have to wait for the bus and

1112 the bus is usually late. And then, oh, if there's weather, --there's always weather well, you have to

1113 account for the weather. So it doesn't always -it may not have as much flexibility as some of them need.

1114

1115 Volunteer 4: Yeah, I was also wondering, this is kind of a big concept, but I can't get it out of my head.

1116 So I need to say it. If there would be an if there could be a timer when you started an activity like

1117 homework is supposed to last an hour. You get the homework done in half an hour, and you say

1118 activity ended. How does that adjust the rest of the demo? We use timers all the time in therapy?

1119

1120 Investigator 2: So in that case, via essentially internally, it would modify the duration of that activity.

1121 Say, okay, now it's done. Everything else could shift up or you could use that time for other, right?

1122

1123 Volunteer 4: Or if you need more time, if you if the activity was set to last an hour up pops an alert.

1124 Oh, you've spent an hour waiting for the bus? Yeah. Well, I need an extra 30 minutes now. That

1125 cascades down, changes everything else.

1126

1127 Investigator 1: So one of the original features that we that is what created the "other" is – for when

1128 something unexpected happens.

1129

1130 Volunteers: mmmhhhh, yes, yeah.

1131

1132 Investigator 1: The bus is late… had a medical issue that came up that interrupted my day. So one

1133 way that the system handles that is to insert an "other," and presumably you could, label it yes this was

1134 – the bus was late. And then you can see that cascade but that…

1135

1136 Investigator 2: Or in the same sense that the example we gave of putting in, putting in doing something

1137 other at the end of school. For now, when we talk about going off to get burgers, like it could be that I

1138 needed to stay in school and do more schoolwork for that hour, right? The system is agnostic about

1139 what that other activity is. It offered that choice. Now the tricky part is what happens if, if it wouldn't

1140 have offered as much time as you actually need to finish something else. That's when you would have

1141 to modify or remove other activities to make room for this new thing that we need to get added.

1142

1143 So yes, it gets, it gets increasingly harder -and so what this technology is really good at is to say, here's

1144 a bunch of constraints and a bunch of things that need to be - picture pieces that need to be fitted in a

1145 Investigator 2(cont): puzzle. And it's really good at figuring out all the different ways the pieces can fit in

1146 the puzzle. If you're saying some pieces have to be removed or some pieces need to be trimmed or

1147 something like that -It doesn't have the knowledge as to what are the pieces that are more expendable

1148 than others or whatever? Not that that couldn't be put into the system, right? But it requires an

1149 additional decision-making and negotiation. I mean, as it is just - in our vote early focus groups with this

1150 user community - even just getting the idea of expressing the, the problem in this general form of

1151 "When could you do this? Because people would want to say, we do this at this time, this at this time,

1152 and so we didn't have any flexibility for moving anything, the puzzle pieces. So it took us a while to just

1153 get to that point where they could be more general about the problem. Getting into issues of

1154 preferences and trade-offs and all - that was way beyond what we were able to recognize. One thing I

1155 didn't, I didn't demonstrate. It's still it's sort of a bit more rudimentary form is if there are things like late

1156 buses or, or bladder accidents or things like that that are predictable that they could happen, but you

1157 don't know when -Alright?

1158

1159 We can actually put information about that into the system. And the system will basically, when it gives

1160 other choices, it gives you less time for those other choices because it's basically saying I'm going to

1161 buffer some time to handle those kinds of situations. And that's a, that's a kinder way of doing it then

1162 always keeping the adolescents nose to the grindstone saying, I'm going to keep you on task just in

1163 case something bad happens. In this case, it says, well, if something bad happens, it takes ten minutes.

1164 So I'm not gonna steal an hour of your time flexibility either -time now for something that might take you

1165 ten minutes. I'll just offer you minutes instead of the full hour. So I'm holding that time in reserve.

1166

1167 Volunteer 1: I think to [name]'s point about tracking data -historically like it, if you didn't have to say

1168 what the "other was," you at least have the data to say what's working, what's not working and - this

1169 keep happening. So maybe that needs to be incorporated to the schedule.

1170

1171 Volunteer 4: And I think that if the "other" - to add to your point -if the "other" was added to that left-

1172 hand column that you could visually see. That's a difference between days and that may have been

1173 your point.

1174

1175 Volunteer 1: Yes.

1176

1177 Volunteer 3: So you are able to log in, backlog your days that have occurred – so you could happen

1178 months' worth of data or two months or whatever.

1179 Investigator 2: We don't but -It would be easy to write. One of the things that we, I didn't show you, is

1180 like removing an activity. The way removing an activity happens in this system is it says, OK, well

1181 again, it's, it's still rudimentary technology. It says, what I'm gonna do is I'm gonna take the input file of

1182 all these activities. I'm going to remove that one and get rid of all the constraints with it. And I'm going to

1183 read in the new file all over again. But the trouble is, if you did, if you've chosen to do that partway

1184 through the day, then it has to sort of replay the day up until that point you get you caught up to where

1185 you should be. So it's logged in all of the choices that you've made because it can sort of replay up until

1186 that point. And once it's stored those right now, if we restarted, its lost that data, but there's nothing in it

1187 creates a file with that information in it. So we could just store that file, or merge files together.

1188

1189 Volunteer 2: I think we need it that. I can really see us using this with a set of students that would

1190 eventually be able to be proficient with it. But it would take a lot of teaching and I really need …

1191

1192 Investigator 2: To be able to replace various things and

1193

1194 Volunteer 2: Yeah.

1195

1196 Investigator 1: So you see this first as a learning tool, with the goal that eventually it could be a

1197 support tool for these students.

1198

1199 Volunteer 2: Ooh, yeah. Yeah. There's, - I don't even think my really high-functioning students with

1200 autism will be able to do this right away without a fair amount of teaching.

1201

1202 Investigator 1: Sure. Are there any groups - knowing that they're not necessarily your target population

1203 -- are there any groups that you think this would be a little more accessible for?

1204

1205 Volunteer 4: Um, any thoughts about gifted populations that have like multiple after-school activities

1206 and things like that? And maybe more complicated outside of school life.

1207

1208 Volunteer 5: Orchestra. Thing is those kids are just texting their mom. I figured it out. I have a ride.

1209 Don't worry. Here's what happened. Band went 30 minutes long - Yeah.

1210

1211 Volunteer 1: And they already have a system set up through their phones. I mean, I think about what

1212 our kids have done.

1213   Volunteers together: Yeah. Yeah. Yeah. Yeah.

1214

1215   Volunteer 4: Yeah.

1216

1217   Volunteer 3: Yeah. But for kids with the medical management without the cognitive issues those kids

1218   run with this. Really well.

1219

1220   Investigator 1: Sure. So if you're potentially somebody who's got a new medical issue, but it doesn't

1221   have any cognitive limitations.

1222

1223   Volunteer 2: Exactly. I'd like to your point about the anxiety of missing out after school -- Like I can't do

1224   that because I have to do this, this, and this way. Well you can, you can, you know, that that's a great

1225   way to show them that they have flexibility and have them take a chance and go do something a little

1226   bit different.

1227

1228   Investigator 1: So there may be a more medical, higher-functioning population that this is a little bit

1229   more accessible – but then as, I think I heard it from a couple of people -- There's a huge need for the

1230   group of kids that will require more teaching and training.

1231

1232   Volunteer 2: Yes. Massive.

1233

1234   Volunteer 3: Yes. Well, yeah, it's a parent question we get all the time, like, what can we do to help

1235   them get organized? How, how can technology help them?

1236

1237   Volunteer 5: Yeah, how and what do you have?

1238

1239   Investigator 1: Cn you see this kind of technology being something they could become independent

1240   with time?

1241

1242   Volunteer 2: Certain populations.

1243   Volunteer 3: With supports.

1244   Volunteer 1: Yes. And with alerts and things like that, you know, depending on what system it's

1245   integrated into, like Alexa tells them your shower tonight. you know, get up. Okay, that's a great

1246   reminder will be here.

1247   Volunteer 5: You know what would be - just thinking, going with the whole voice activation. Is there

1248   any way - This would be cool? If let's say Jane is doing homework but get stuck on something, would

1249   she be able to do an audio clip, an audio file of say, ask for help on this section. So then it would be a

1250   nice audible reminder for her to say, I need to ask or for help – or for some other reason just being able

1251   to put in what's the software that you can just – ummm.

1252

1253   Investigator 1: Dragon?

1254

1255   Volunteer 5: Not Dragon, Inspiration - It's like an audio note or whatever.

1256

1257   Volunteer 2: Put an audio note in there – even for medications, medications, do an audio note, get refill

1258   their prescription.

1259

1260   Volunteer 6: I am on my last cath, please get more.

1261

1262   Investigator 1: I don't know the answer to that.

1263

1264   Investigator 2: Well, this technology was built for a somewhat different purpose. Right out of the

1265   managing activities are again, our hope is that with the help of the video and putting this stuff on open

1266   source, that these capabilities then would be woven into other tools that are out there - that are built for

1267   ---helping remind people to do things, of reminding people how to do them. You know, enabling

1268   technology has a particular system that's really good at, you know, if there's an activity, you click on it

1269   and it gives it a demo video or whatever of what you're supposed to do for that activity. These clearly

1270   we don't have it here, but there's nothing that says that couldn't be woven. These pieces couldn't be

1271   woven together.

1272

1273   Volunteer 5: Right, well that would be a good thing to be.

1274

1275   Investigator 2: And similarly, when we were thinking about what an interface would look like if we didn't

1276   have an iPad, just a phone, right? I mean, all you really need for somebody who's not, not highly

1277   functioning but is compliant is just this - is the top part here, right? All it needs to say is, these are your

1278   choices –right? As long as you make, as long as you make any of those choices, you're going to be

1279   safe. You're not going to break anything, right? Maybe later on in the day you say, well, I feel really

1280   constrained. It's because some choice and you didn't see the consequences ahead of time. But with a

Investigator 2 (cont): parent or whatever, they could go through and say, well, here's why that was the case. So it, as technologists, we love these kinds of things where we can see the puzzle pieces shifting around and all that, right? But really all you need is the advice as to say, if you do any of these three things, right now you're going to be fine. Or you have an hour you could do something else with and you're still going to be find later on today.

Volunteer 3: A friend of mine -had she active in the independent living movement and community in Ann Arbor and this I think it would be so nice for parents to just try it out prior to their kid moving out of home?

Investigator 1: Sure.

Volunteer 3: No. Okay. My child's going to be accountable. I can sort of check remotely and not even live with them. Just be checking that they're entering. What has to be done during the day. And then I also think it would give some parents who have to come for like catheterization - as you were saying, - or feel like they have to go do those types of medical implementations and school give them the confidence if they knew there was another way to find the - child that this was going to happen, sort of remove the parents from having to be present with the older kids.

Investigator 1: And actually in some of our initial groups, catheterization was one of the big sticking points.

Volunteer 3: Huge. yeah, [general volunteer agreement].

 Investigator 1: That, that we were hoping to help plan around, but that's a good example of something that can't be done- can't be moved without recognizing what these constraints are.

Volunteer 3: Exactly.

Investigator 1: Well, It's 7:00. I am so thankful that you all came and talked. Are there other comments that folks have been sort of sitting on and not saying, yet?

Volunteer 2: I just thought of my mother who I'm kind of helping take care of herself. SO it's not just kids. It's parents too. Remember you have to check your blood sugar!

1315   Investigator 1: Yeah. We've definitely been focused on one end of the age spectrum, but that doesn't
1316   mean we would have to be.

1317

1318   Investigator 2: No. And in terms of people with medical issues, right? The concern is that it's missing
1319   one of these activities could have dire consequences when every adolescent needs some help
1320   managing their schedule. But for many adolescents, if they, if they, if something goes haywire, -- you
1321   know they get a low grade in something or whatever -- but they're not sort of, their health is not
1322   compromised or potentially compromised, right? So that was why we're emphasizing this particular
1323   population. Yeah, yeah, we get it a lot where we describe some of this work and people say, I could use
1324   that or every adolescent has trouble with these kind of thing?

1325

1326   General Volunteers: Yeah. Yeah.

1327

1328   Volunteer 3: Yeah, that's really true.

1329

1330   Investigator 1: Now, do we have the room for the next half hour?

1331

1332   Investigator 2: We have a for as long as we need it today.

1333

1334   Investigator 1: So you have all filled requirement in terms of helping us with the focus group. If anyone
1335   is willing and able and answer a few of [names] questions – you are welcome too. Just as a reminder
1336   this is 100% optional and so if you need to buzz out and have to leave that is no problem at all.

1337

1338   END OF TRANSCRIPT