

# Student Perceptions and Use of the Pathway Active Learning Environment



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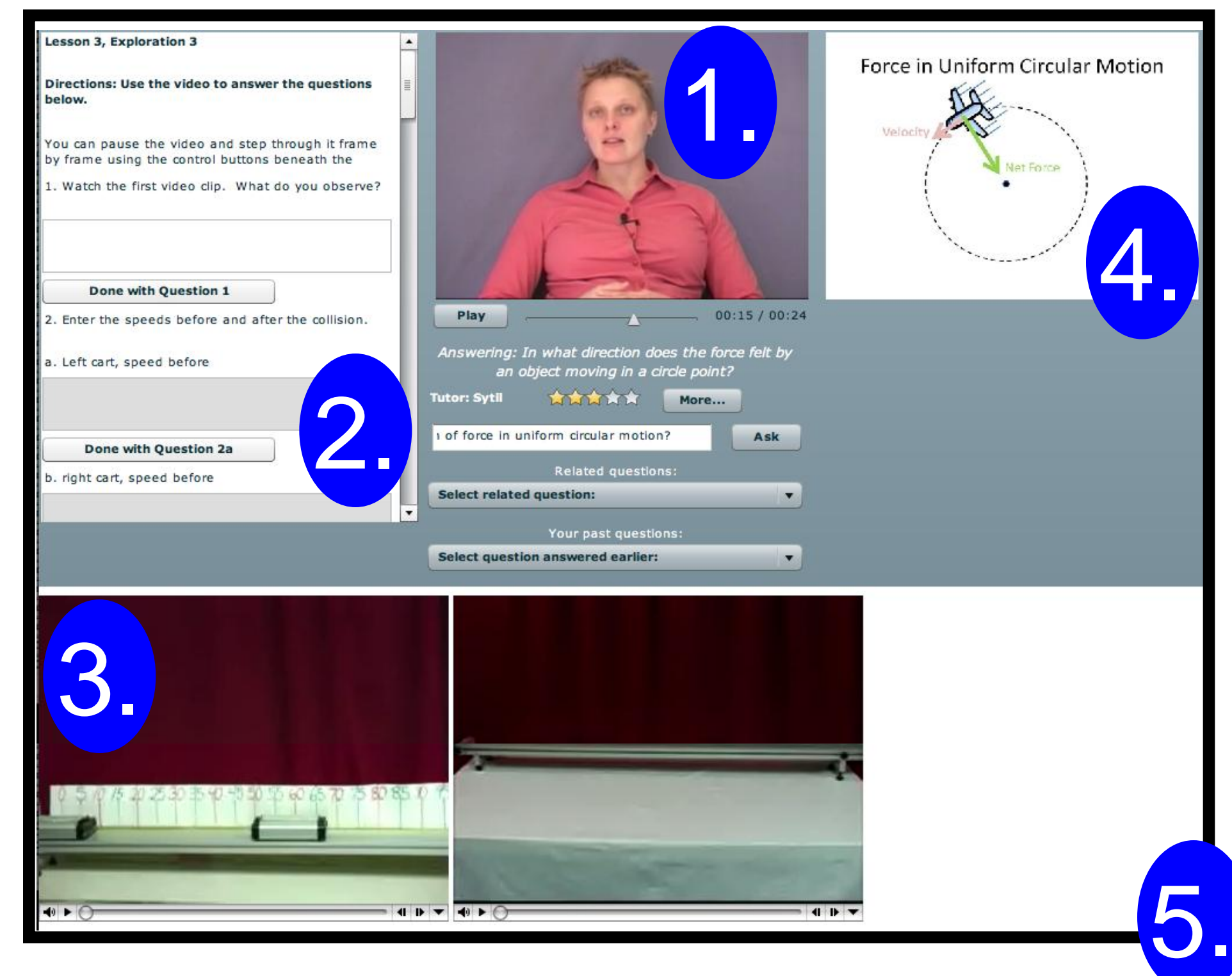
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## Pathway Active Learning Environment (PALE)

1. Synthetic tutor answers questions, introduces activities & explains concepts
2. Lessons on Newton's laws guide interaction & collect responses
3. Video clips connect concepts to reality & allow frame-by-frame measurement
4. Multimedia support tutor responses
5. Interactions are logged with timestamp



Multiple  
tutors:



## Research Design

### Student Population

- Recruited 22 algebra-based physics students
- Volunteers were given a modest compensation with a bonus for completing all three interviews
- Students were assigned one of the four experiences and when applicable one of two tutors

### Research Goal

- Observe students' use of PALE directly
- Investigate student thoughts and feelings about working with the system

### Interview Format

- Three 1.5 hours sessions: 1 hour with PALE and a thirty minute interview
- Protocol is semi-structured and seeks to probe students' perceptions of PALE, usage patterns and physics understanding
- Interviews were conducted by the tutors
- Analysis of interview data is in progress

Experience 1  
Lessons Only

Experience 2  
Lessons and tutor

Experience 3  
Lessons, tutor and  
multimedia: image

Experience 4  
Lessons, tutor and  
multimedia: video

## Preliminary Themes of Interest & Sample Data

### Perceptions of tutor

**F\***: ...did you like this idea of asking questions and- ?

**S1**: Yeah, because it's more interactive...I guess you're not talking to them, but it's more personal...I took an online class and they just posted the lectures and so... you can ask what you want to know versus just being given the information...you can pause her if she's talking too much and just get what you need out of what she's saying.

### SI usage: typing questions vs. quick-start menu questions

**F**: Did you ask many questions?

**S2**: I asked a few. I mostly used the quick-start ones because those seemed to be more helpful and easier to like, relate to the question.

### Feedback on veracity of responses

**S3**: ...one of the things I like about the online homework [in the physics course] is that it gives you feedback about what you possibly could have done wrong. ...but if they [students using PALE] do get it wrong...maybe give them some sort of hint, or something...

**F**: Do you feel this is a way you would want to learn physics?

**S3**: Um, not exactly like this because I'd like to know if I got it right before I go on to the next thing.

### Multimedia support

**F**: Did you find that video...next to the tutor, was that helpful, or was that distracting?

**S4**: I didn't think it was distracting. I thought it was pretty helpful, um I didn't use very many of those, I think I only used one or two, but I didn't find it distracting at all.

**F**: When you say you only used one or two, what do you mean? It comes up right with the-

**S4**: because, like, they were showing examples. If I had a question, I'd ask it and then she'd say something I'd remember or understand, and then it would continue on with the video, and I didn't really need to watch it after she'd touched and explained on it.

**F**: How did you feel about the pictures

**S5**: I think they're pretty important. ...So, yeah the pictures are very helpful especially with, uh, you've got a net force, a picture with everything there...

### Video measurement

**S5**: ...this is the first time I've ever had to use frame-by-frame or anything like that to find my own values, which was actually quite an interesting way to approach a problem, I must say.

**F**: How do you feel about doing that more in a course?

**S5**: I would do it. I would do it, yeah. I mean there's much more to physics than then just doing things by theory. There's also, I mean, seeing how it- meaning an example of it in the real world...

**S6**: With the video player I kind of wish there was seconds passed instead of having me calculate seconds, you know? ...So I could like, just subtract the times, how many frames are in that time and..just, I think that would be easier.

\* F = Facilitator

S = Student

## Further Questions

- Do student perceptions match their behaviors as recorded in the PALE log?
- Is it possible that there is no single best configuration for all?
- If, so how would a student or the PALE go about achieving the best configuration?

## Ongoing & Future Work

- Continue qualitative analysis of interview data
- Connect & cross-check interview data with PALE log