



U.S. Army Research, Development and Engineering Command

The Impact of Student Expectations and Tutor Acceptance on Computer-Based Learning Environment Acceptance and Future Usage Intentions



TECHNOLOGY DRIVEN. WARFIGHTER FOCUSED.

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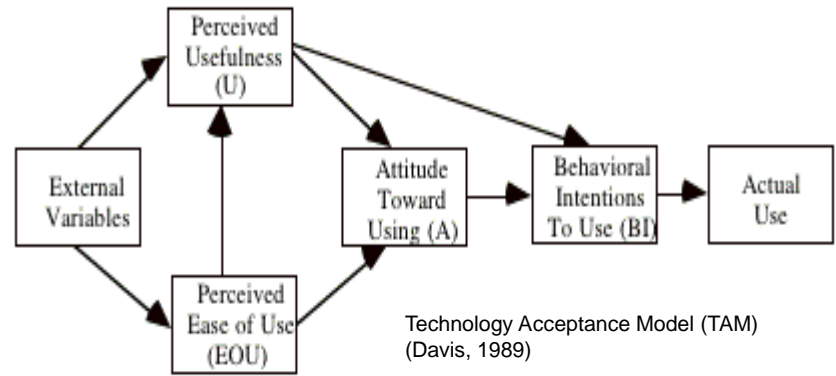
International Defense and Homeland Security Simulation Workshop 2011

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- **Research Motivation/Background**
- **Methodology**
- **Preliminary Results**
- **Conclusions**
- **Questions**



- Users' acceptances of a technology is critical to its success.
- What factors contribute to technology acceptance that can be measured?
 - Users' Attitudes, Perceptions, Usability, Expectations, individual differences, etc...



- Intelligent Tutoring Systems (ITSs) and other computer-based learning environments approach to promoting technology acceptance is to embed agents into the learning environment.
 - Facilitates the learning process
 - Establishes a learner-agent relationship
 - Impacts learner outcomes



Can you save the situation?

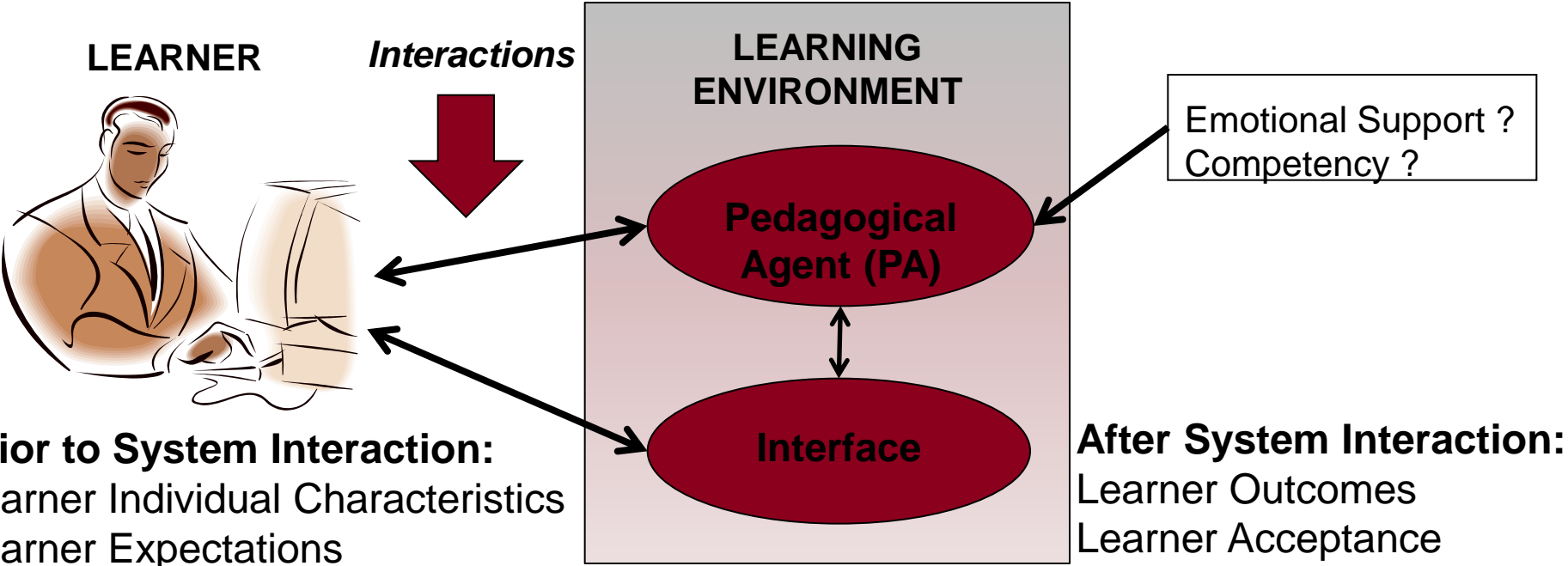
Select the best option

We have this great van with a state of the art entertainment center to keep your kids happy on those long weekend trips! You can test drive it tomorrow!

Well - You were looking at our new vans. Why don't you tell me a little more about what you need.

The Flowchart shows a decision tree with nodes for 'van', 'entertainment center', 'state of the art', 'kids', and 'weekend trips'.





- System Acceptance Evaluations—since late 80s/early 90s; PA Acceptance Evaluations –since 1999+
- No or Limited Empirical Investigation of:
 - The relationship between these two types of interactions
 - Learner’s expectations prior to system interaction of the agent and learning environment
 - How both interactions impact learner outcomes



- What are student's expectations of a PA and a computer-based LE?
- What is the relationship between learners' acceptance of a PA and their acceptance of a computer-based LE the PA is embedded within?
- How does a PA's characteristics of emotional support and competency impact learners' mood and knowledge acquisition?

- A learning environment was developed to teach learners the rules and strategies of Sudoku.
- **4 versions of PA:**
 - Emotionally Supportive & Competent (ESC) (N=9)
 - Competent Only (CO) (N=8)
 - Emotionally Supportive Only (ESO) (N=9)
 - Neither Emotionally Supportive or Competent (NESC) (N=8)
- Pre-, Mid-, and Post-experiment surveys
- **Sample Population:**
 - 35 volunteers (22 males and 14 females)
 - Sudoku Experience: 31% - None; 31% - Basic; 37% - Advanced
 - 81% advanced computer users.
 - 91% believe that computer can help learn difficult concepts.
 - 65% were interested in increasing their Sudoku Knowledge.
 - 86% were motivated to participate in the study.



1. Student's acceptance of a PA's qualities will have a strong, positive relationship to their acceptance of the learning environment.

2. The PA condition experienced by the learner will have a direct effect on their self-reported mood dimensions (Pleasure, Arousal, and Dominance).

Audie Can Help...

What Can I Help You With? Cancel

Lone Rangers Hint *Intermediate Technique - Limit 2/game

Twins Hint *Advanced Technique - Limit 2/game

Triplets Hint *Advanced Technique - Limit 2/game

Display Possible Values of Empty Cells **Golden Ticket - Limit 4/game

Need a refresher on CRME, Lone Rangers, Twins, or Triplets?

Let me show you how these concepts work!

CLICK HERE

Sudoku Tutorial

Take your time to understand this tutorial...no need to rush. I talk fast, but I will always wait for you;) Oh..and don't forget to Scoll down as needed!

Sudoku is an easy to learn logic-based number placement puzzle with 3 simple rules.

Sudoku originated in Switzerland in the 18th Century, but became popular world-wide in 1986 when it was publicized in Japan.

The goal is to use the given numbers to complete the puzzle by placing the numbers 1 through 9 without repeating a number in any row, column or 3X3 minigrd.

The blue Sudoku puzzle to the right lays out the three Sudoku Rules, which are:

Next

		9		7	2	8	7		3
2	7	8		3		1	5	6	8
9				6	4		9	2	1
5		6		2			6	1	8
	6			3			4		2
1		5					2	7	6
1		7	6		3	4	5	4	
		5	4				1	3	9
7	9	1		8	5		8	5	4

Sudoku Conquest

SUDOKU!!!

Audie's Suggestions Box
Scroll Down As Needed

Hi Friend, Welcome to the Learning Environment!
Here, we will be playing our 2 Sudoku games.

Learn Interface

Select number 1 2 3 4 5 6 7 8 9 Erase

Rules

Activities Box

Column v	1	2	3	4	5	6	7	8	9
Row > 1									
2									
3									
4									
5									
6									
7									
8									
9									

Sudoku Conquest

SUDOKU!!!

TIME: 00:34

SCORE: 90

Audie's Suggestions Box
Scroll Down As Needed

Since there is 9 in Column 8 and Column 9, Which column should you place a 9 to satisfy the Columns Rule?

Yes, you are correct! There cannot be another 9 in either Column 8 or 9! Great Job.

Now we know the 9 should go in Column 7, but what row should it go in?

Sorry, you are incorrect! In Column 7, 9 has to go in Row 5, because the 3rd Minigrad already has a 9 and Row 6 already has a 9. Hang in there, you will get it.

Now you know that cell (7,5) = 9. Place '9' in the appropriate cell now, then click on ME again.

Activities Box

Number 2 placed at (2,3)
Invalid move of 9 at (8,5)
Invalid move of 9 at (8,6)
Number 9 placed at (7,5)

Select number 1 2 3 4 5 6 7 8 9 Erase

Rules

Column v	1	2	3	4	5	6	7	8	9
Row > 1			6	7		2	3	1	
2	8				9			2	7
3	7	2	5			8		9	
4			9	3	6		8		2
5	4	7			1		9		3
6	2	6				9			1
7		9	7				1		
8		8		9		1	4	3	5
9	3	1				6	2	7	9

New game started. Elapsed Time: 34 seconds

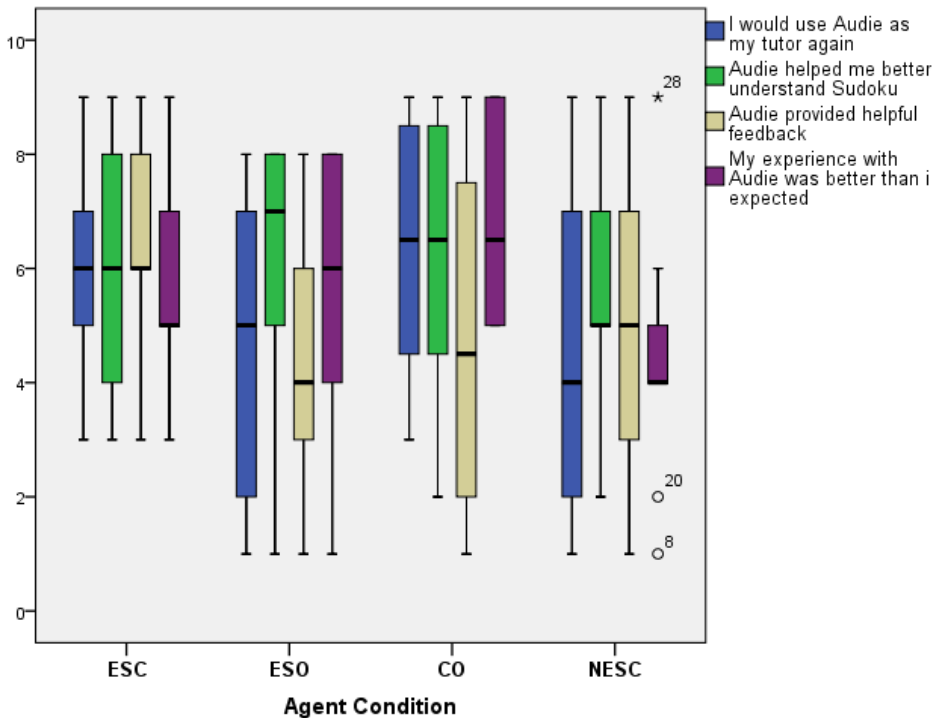


Statement: A tutor that...	Min., Max.	Mean	Std. Dev.	Ranked	
				Most Imp.	Least Imp.
...you would use again	4,9	7.91	1.463	40%	40%
...you would strongly recommend to others	4,9	7.71	1.447	29%	54%
...you would enjoy working with	6,9	8.31	0.963	34%	34%
...you feel motivated to work with	5,9	8.14	1.264	14%	51%
...helps you better understand the learning content	7,9	8.60	0.604	49%	26%
...lets you know how well you are doing	2,9	8.06	1.434	37%	20%
...keeps you updated on your progress	5,9	8.11	1.022	31%	23%
...understood how much you knew	6,9	8.43	0.815	31%	31%
...provided you helpful feedback	5,9	8.51	0.853	49%	17%
...Increases your interested in the learning content	5,9	7.91	1.380	31%	34%
...holds your interest	5,9	8.14	1.264	14%	34%
...you're satisfied with its performance	5,9	8.09	1.147	40%	34%

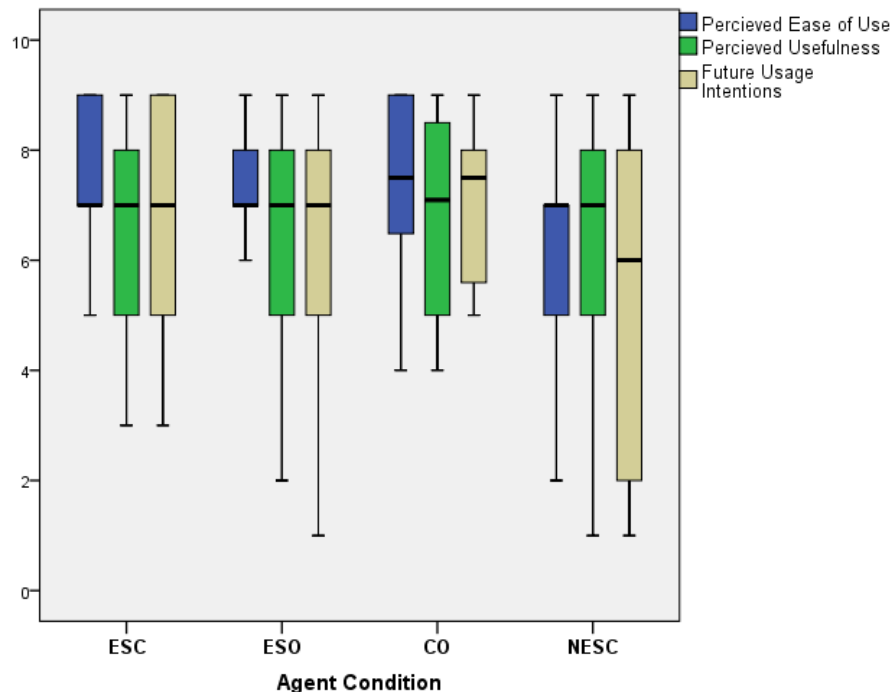
Statement: A learning environment that...	Min., Max.	Mean	Std. Dev.	Ranked	
				Most Imp.	Least Imp.
...is easy to use. (PEU)	5,9	8.14	1.115	57%	26%
...is controllable. (PEU)	2,9	7.43	1.668	17%	34%
...is enjoyable. (PEU)	4,9	7.54	1.482	17%	51%
...does not require a lot of mental effort. (PEU)	2,9	6.74	2.049	26%	51%
...is easy to learn how to use. (PEU)	6,9	8.14	1.089	40%	31%
...is ease to intuitively navigate through. (PEU.)	4,9	8.17	1.224	26%	17%
...has good functionality (features). (PEU)	5,9	8.06	1.211	37%	20%
...is useful for learning content. (PU)	5,9	8.40	1.006	51%	17%
...is reusable for learning other content in the future. (UI)	4,9	7.43	1.720	29%	51%
Note: Perceived Ease of Use (PEU), Perceived Usefulness (PU), and Future Usage Intentions (UI)					



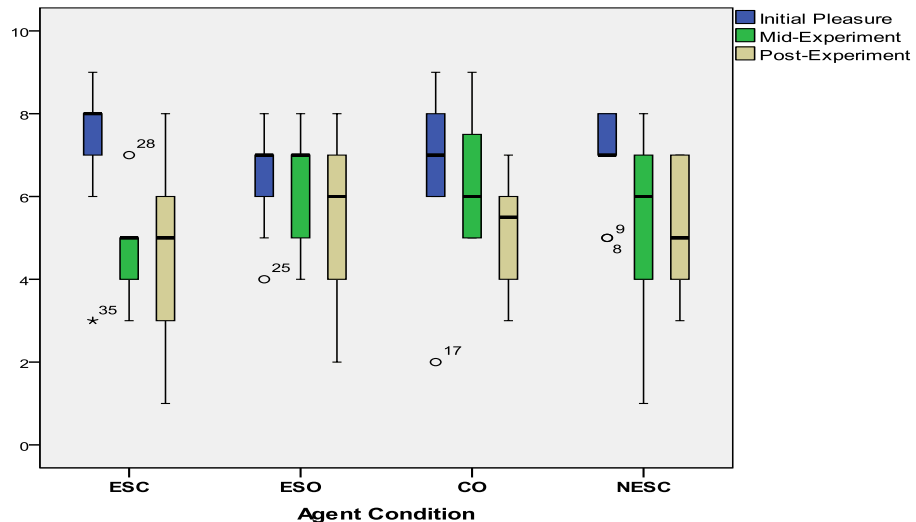
Tutor Perceptions



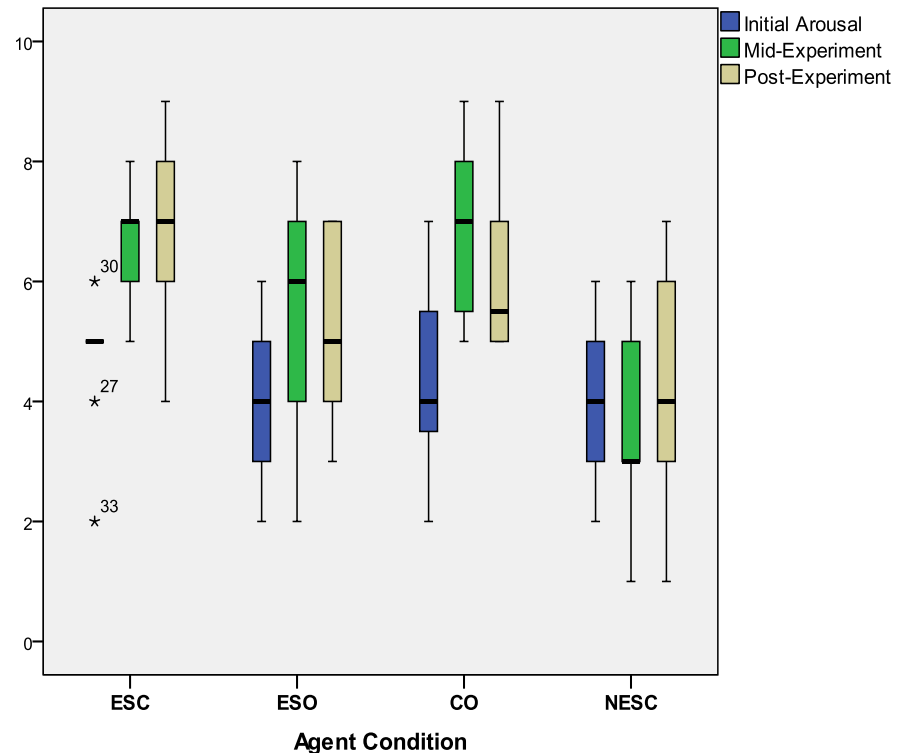
Acceptance of Learning Environment



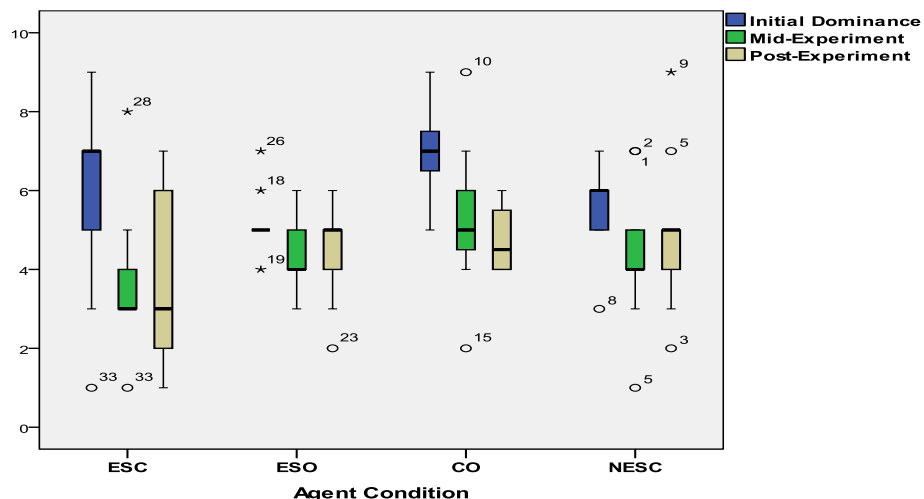
Mood Assessment Results: Pleasure



Mood Assessment Results: Arousal



Mood Assessment Results: Dominance



- A few limitations:
 - Small Sample Size
 - Learner's Expectations of the PA and LE were not met.
 - LE is more suitable for novice than advanced Sudoku players.
- Learners' initial expectations of a PA and LE may provide better insight to their attitudes/perceptions toward and interactions with the system.
 - Different levels of initial competency is an influential factor.
- **There is a significant positive connection between the learners' perceptions of a PA and the LE it's embedded within; thus, increasing the learners' trust/acceptance in the PA will increase their trust/acceptance of the LE.**
- More investigation is needed to:
 - Explore the relationship between expectations and acceptance.
 - Understand how a PA's characteristics (i.e., emotional support and competency) influence learners' moods and other outcomes.



Questions

