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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Topics for Discussion

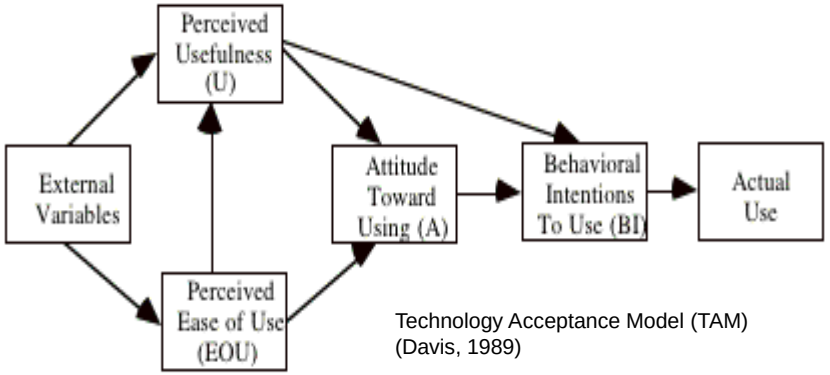
- Research Motivation/Background
- Methodology
- Preliminary Results
- Conclusions
- Questions

Research Motivation/Background

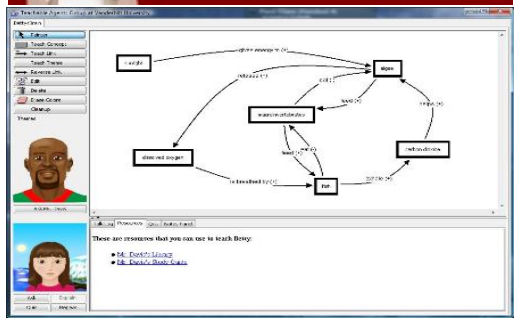
- Users' acceptances of a technology is critical to its success.

- What factors contribute to technology acceptance that can be measured?
  - Users' Attitudes, Perceptions, Usability, Expectations, individual differences, etc...

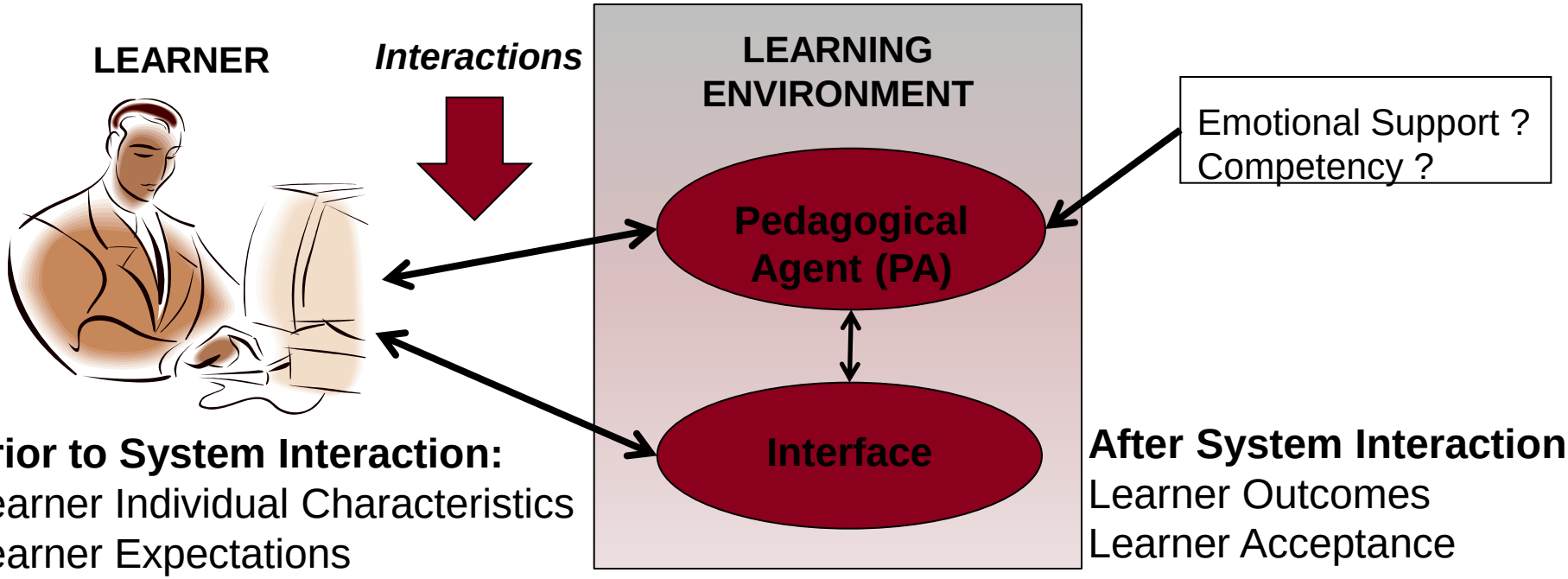
- Intelligent Tutoring Systems (ITSs) and other computer-based learning environments approach to promoting technology acceptance is to embed agents into the learning environment.
  - Facilitates the learning process
  - Establishes a learner-agent relationship
  - Impacts learner outcomes



Technology Acceptance Model (TAM) (Davis, 1989)



Research Problem



- 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

Research Questions

- 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?

Methodology

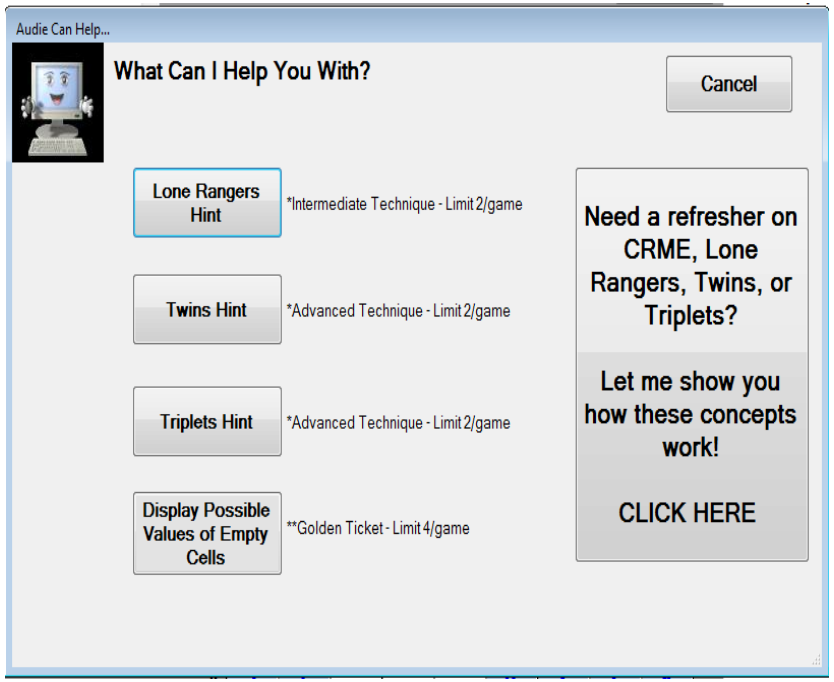
- A learning environment was developed to teach learners the rules and strategies of Sudoku.
- **4 versions of PA:**
  - Emotionally Supportive & Competent (ESC) (N=9)
  - Competent Only (CO) (N=8)
  - Emotionally Supportive Only (ESO) (N=9)
  - Neither Emotionally Supportive or Competent (NESC) (N=8)
- 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.

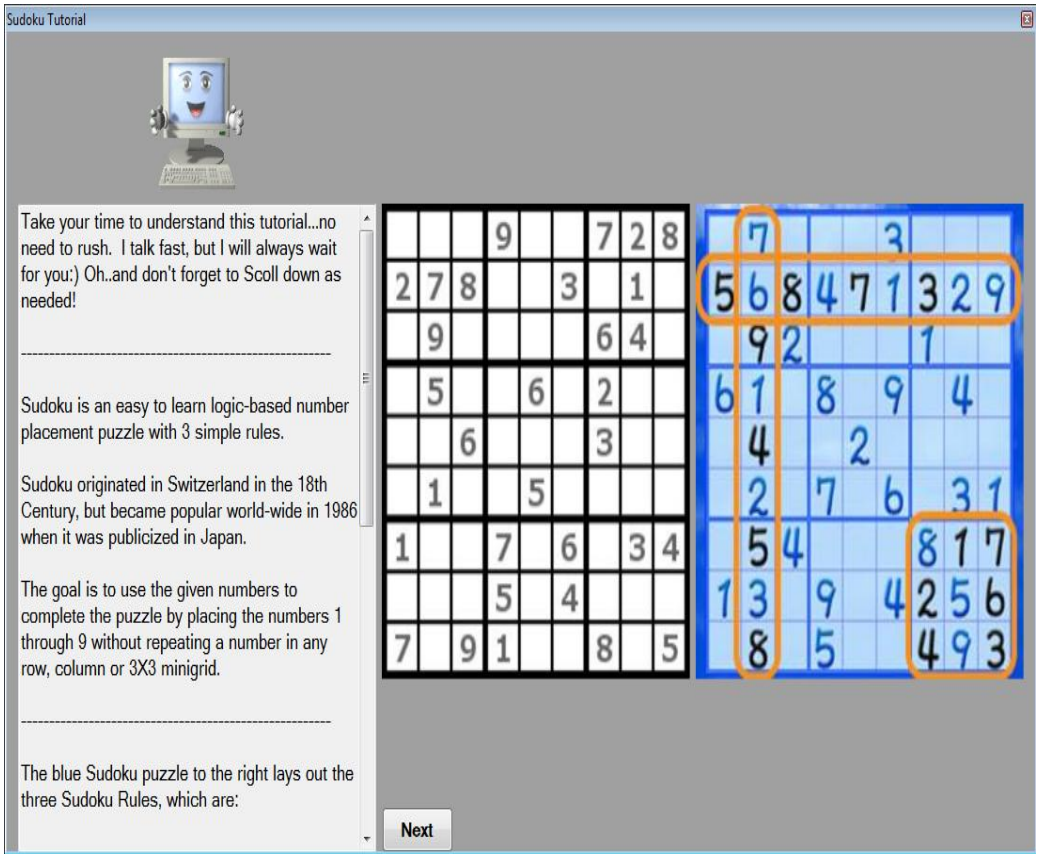
Hypotheses

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

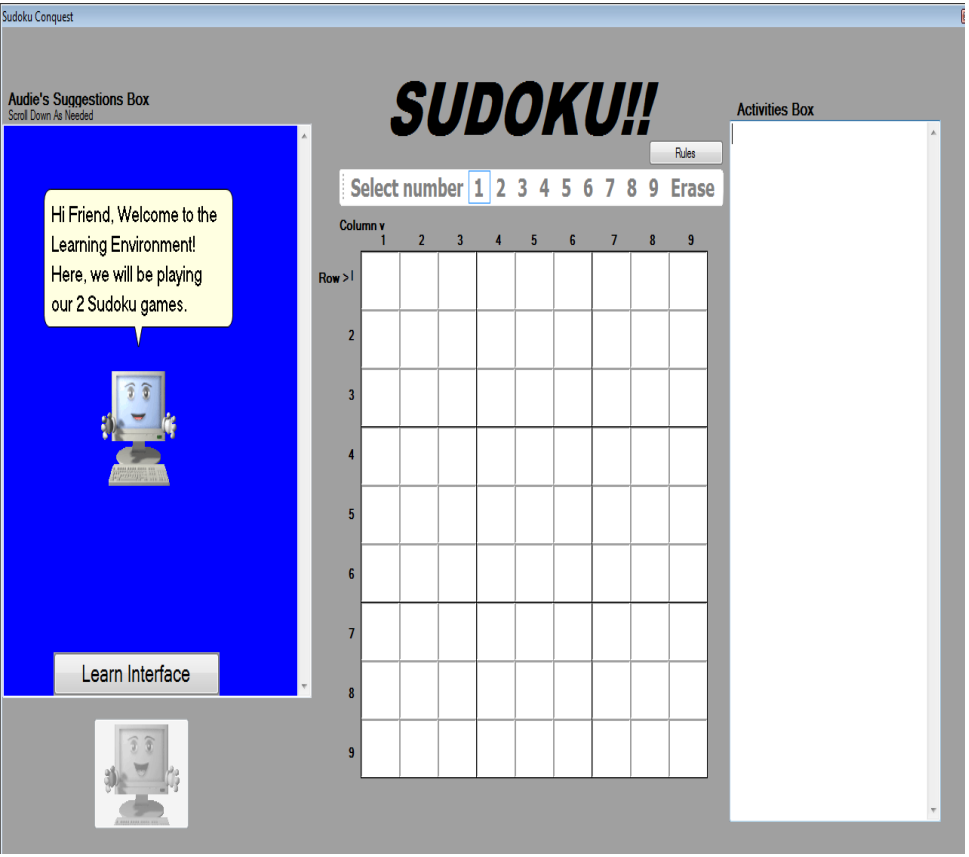
2. The PA condition experienced by the learner will have a direct effect on their self-reported mood dimensions (Pleasure, Arousal, and Dominance).

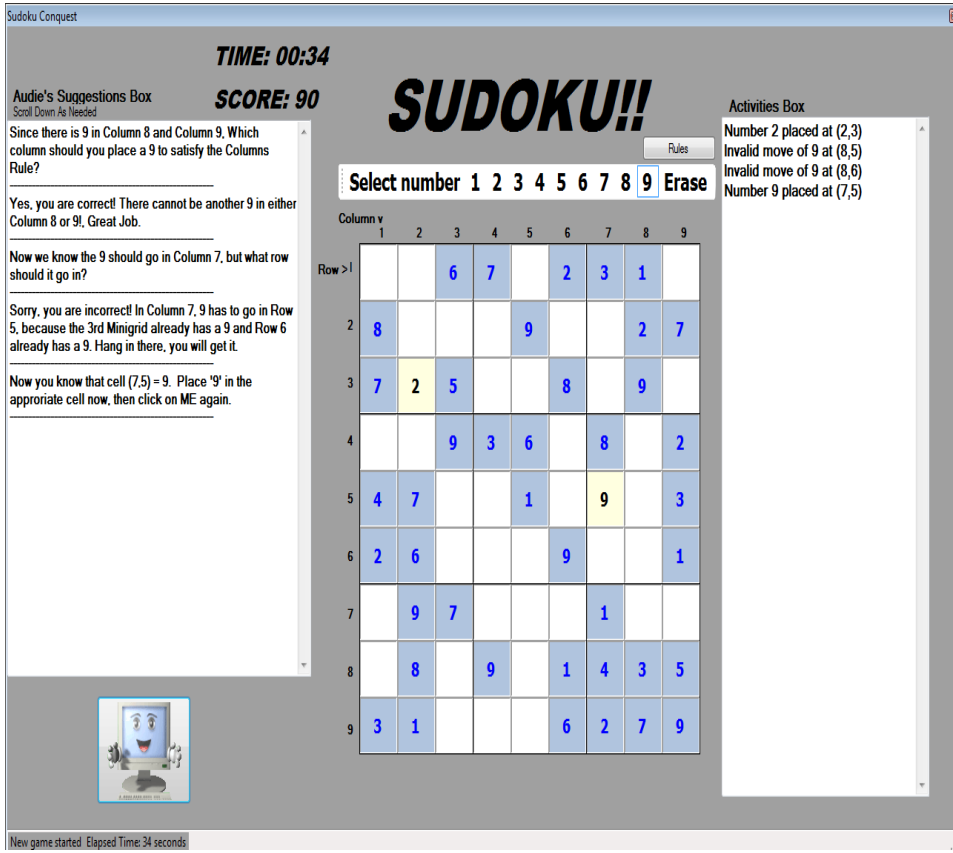
Learning Environment





Learning Environment





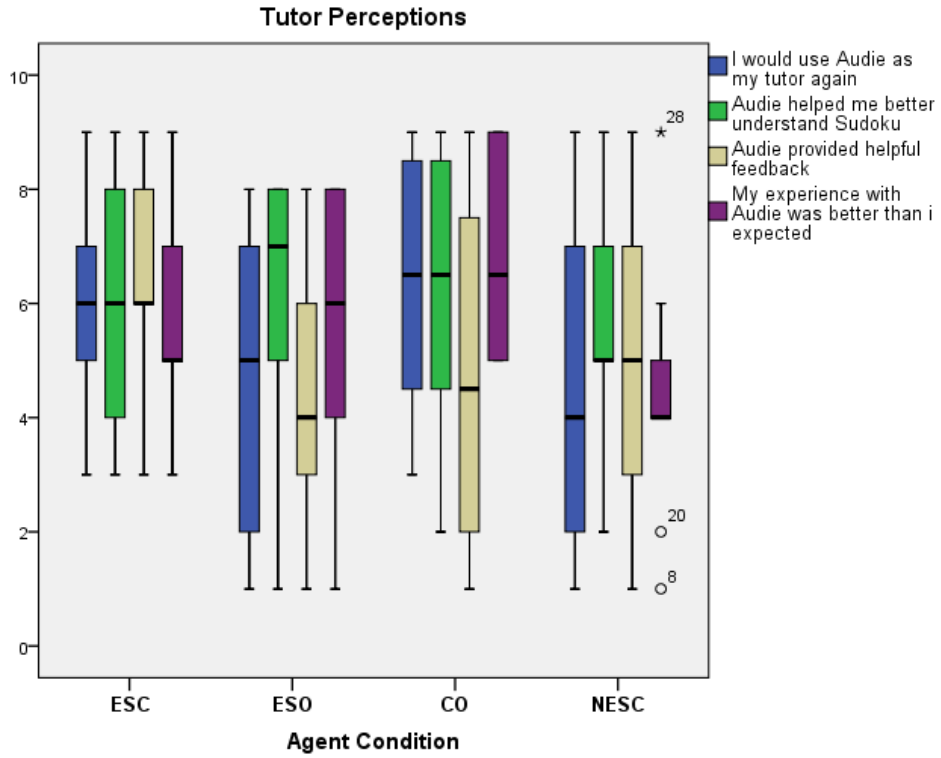
Initial Expectations Results

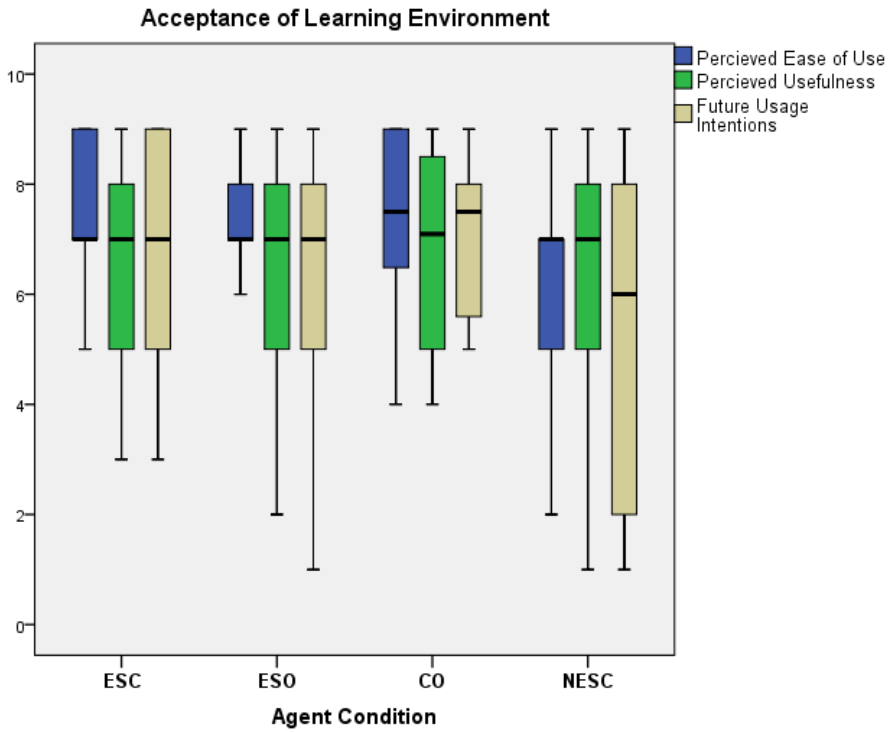
Statement: A tutor that…	Min., Max.	Mean	Std. Dev.	Ranked Most Imp.	Ranked Least Imp.
…you would use again	**4,9**	**7.91**	**1.463**	**40%**	**40%**
…you would strongly recommend to others	4,9	7.71	1.447	29%	54%
…you would enjoy working with	6,9	8.31	0.963	34%	34%
…you feel motivated to work with	5,9	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.	Ranked 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%

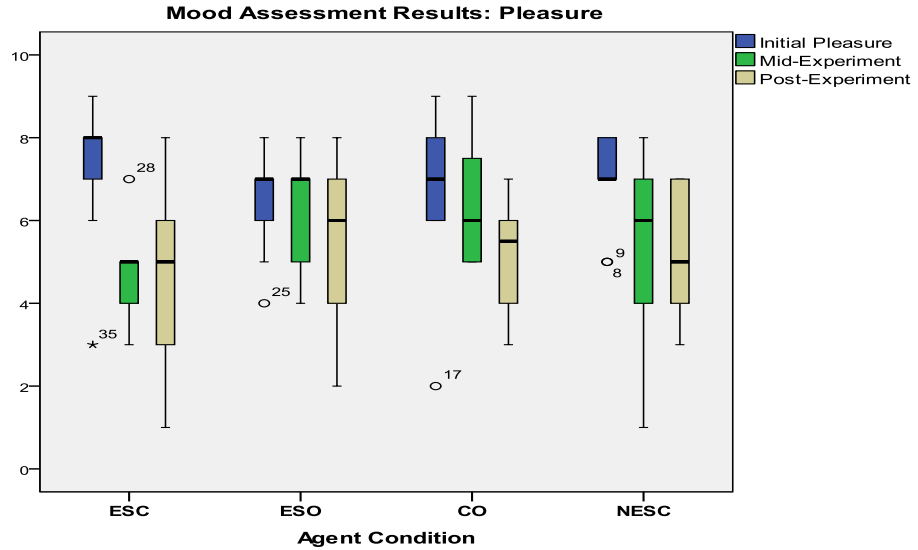
Note: Perceived Ease of Use (PEU), Perceived Usefulness (PU), and Future Usage Intentions (UI)

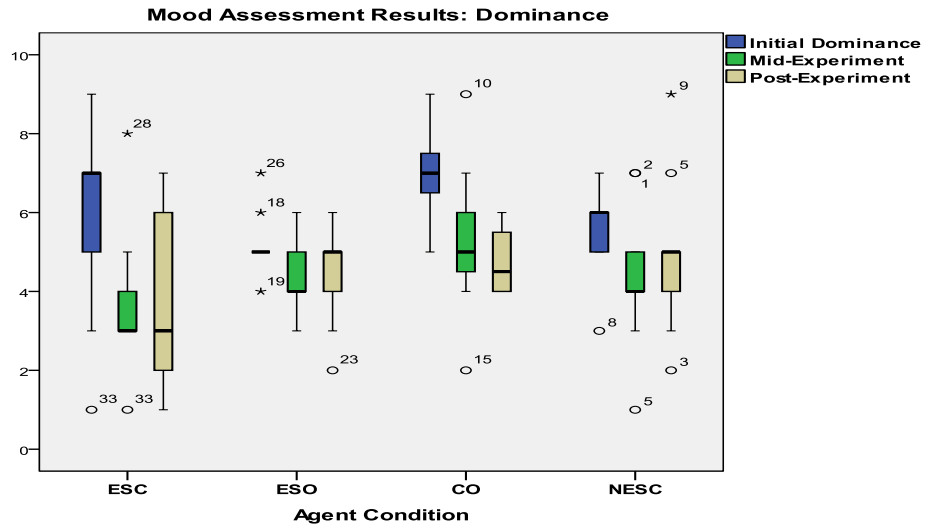
Acceptance of PA & LE Post-Interaction

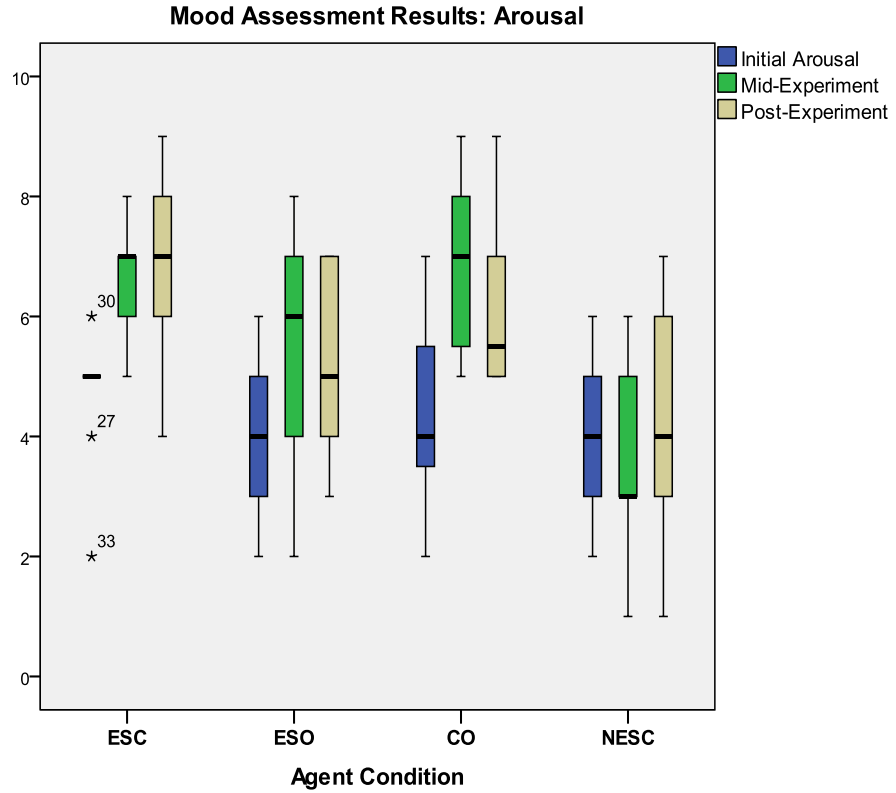




Mood Assessment







Conclusions

- 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