Assignment – 1 - Online Problem Solving

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1. The Three Jugs Problem http://www.cut-the-knot.org/water.shtml
2. Tower of Hanoi https://www.mathsisfun.com/games/towerofhanoi.html
3. Entrapment: http://www.theproblemsite.com/games/entrapment.asp
4. Trio Match: http://www.theproblemsite.com/games/trio_match.asp
5. Wolf, Sheep, & Cabbage http://www.plastelina.net/game1.html

http://www.novelgames.com/flashgames/game.php?id=53&l=e

1. Which problems did you work through?
2. Which problem was the easiest to solve?
3. Why was it easy to solve?

I attempted all the problems, Tower of Hanoi, and Entrapment were the easiest ones for me as the instructions were clear to me.

In "the wolf, sheep and cabbage", once I figure out, I could take back the sheep it became easy.

For the Trio Match and Three Jugs problem, I read a few times the instructions and try to find the "pattern" or methodology to follow. The three jugs problem turned fascinating to me once I figure out the strategy to follow.

The Trio Match game long instructions and multiple options perhaps contributed to be the "hardest" problem to solve.

Game	Difficulty (1-Easiest 3-hardest	Type of problem	Declarative Knowledge	Procedural Knowledge
The Three Jugs Problem	3	Moderately structured		
Tower of Hanoi	1	Well structured	What – condition/association (Why) Prediction and result/explanation	Learner simply memorizes the procedure; tasks often become automated with practice.
Entrapment:	1	Moderately structured		

Trio Match	3	Moderately to Ill structured	Facts (Game rules)	• Must help the learner define the context and goals of the problem. • Provide opportunities for divergent practice (many right answers). • Requires skills of mental modeling, problem representation, analogical/abstract reasoning, and evaluation, all within the context. Transfer is strong. • Learner must invent a strategy which suits the context.
Wolf, Sheep, & Cabbage	2	Well-structured		

4. What type of problem was it (see Kirkley, 2003 article pg. 8)? Explain.

For this question, I will use the easiest (Tower of Hanoi) and "hardest" (Trio Match)

Tower of Hanoi – I defined it as well structured since even though the player may try multiple attempts exceeding the 7 minimum moves to solve it, once you figure out I believe there is no more than that particular way to solve it. The final solution may be achieved after more moves, but the learner can easily memorize the solution and that's the end of it. Further challenges may be added but I think the strategy can be easily understood and master.

Trio Match – I am not a "gamer" person so I don't do this kind of games and for me it was the one game that took me longer to achieve higher score consistently. I see this "puzzle" as an ill-structured problem because all solutions are not well defined or predictable, there is option for multiple solutions and approach, I would not know what to do without the instructions although the goal was clear.

5. What strategy did you use to solve the problem?
6. How did you develop this strategy?

I am a visual person, so I had to draw myself or take notes of my moves or strategy as I try to find a pattern or consistent methodology.

That was particularly useful with the Tower of Hanoi, the Three Jugs problem, and the Entrapment puzzle in which I simply draw

Tower of Hanoi **Easiest**	Three Jugs **(second "hardest")**	Entrapment
Smallest to third pole Medium to middle pole Smallest to middle Biggest to third Smallest to first Middle to third Smallest to third (voila!)	Third pours to second Second pours to one One pours to third Second pours to one Third pours to second Second pours to one (voila) 	Doodling

7. What declarative knowledge was needed to solve this problem? To solve the easiest problem for me, "Tower of Hanoi", I rely basically on the condition given (Facts and Principles) for not stacking a larger disk into a smaller one.

8. What procedural knowledge was needed to solve this problem? I consider this as a well-structured problem where all the information is provided and there is a common solution for the given problem

9. Which problem was the most challenging for you to solve?
10. Why was it difficult to solve?

Trio match was the hardest one, due to the "lack of predictability" and "longer" instructions in relation to the other puzzles.

11. What type of problem was it (see Kirkley, 2003 article pg. 8)? Explain.

Initially I considered as an ill structured problem, but I think it fits into the moderately structure problem once you become more familiar with it, with room to the development of strategy.

12. What strategy did you use to solve the problem?

For this problem, I try to pay more attention to the constrains and instructions as one reaches new levels. For me it is easier when I see a pattern or can figure out a logic behind the puzzle. I'm sure there is one, but I did not play long enough

13. How did you develop this strategy?

For this particular problem, I think it is required to continuously come up with an strategy to achieve the next goal. The goal of the game is a moving target as you level up.

14. What declarative knowledge was needed to solve this problem?

I will think this particular problem uses Facts (constrains and rules of the game),"Concepts" learned through the game and Principles , by predictions of the starting/initial levels.

15. What procedural knowledge was needed to solve this problem?

I believe it is an ill structure problem that requires experience, cognitive flexibility, the goals of the problems changes and becomes more complex as the level increases and it provides opportunities to multiple solutions.