University of Jordan
School of Engineering
Industrial Engineering Department

EXPERIMENT 6

The learning curve phenomenon

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Introduction:

This experiment measures the individual's basic level of function in the areas of eye-hand coordination and the ability to follow verbal instructions.
The learning curve phenomenon refers to the reduction in cycle time that occurs in a repetitive work activity as the number of cycle's increases. The learning curve is easiest to visualize in terms of an individual worker who perform a manual task.

Instrument:

This is a test of motor coordination and learning which requires both arms to work together. The subject's task is to move the metal pointer around the anodized star pattern without leaving the pattern.

Figure: Two hand coordinator

Objective:

- To study the effect of bilateral transfer of learning in a Two hand coordinator.
- Demonstrate the learning curve of human performance.

Procedure:

One of the common patterns which has been used is a six pointer star made up of two sets of parallel lines approximately 1/4 " apart. The subject's task is to move the metal pointer around the anodized star pattern without leaving the pattern. Errors are tailed by counting the number of times the subject touches or crosses over one of the sides.

For each subject assigned to practice this experiment; the procedures should be followed are:

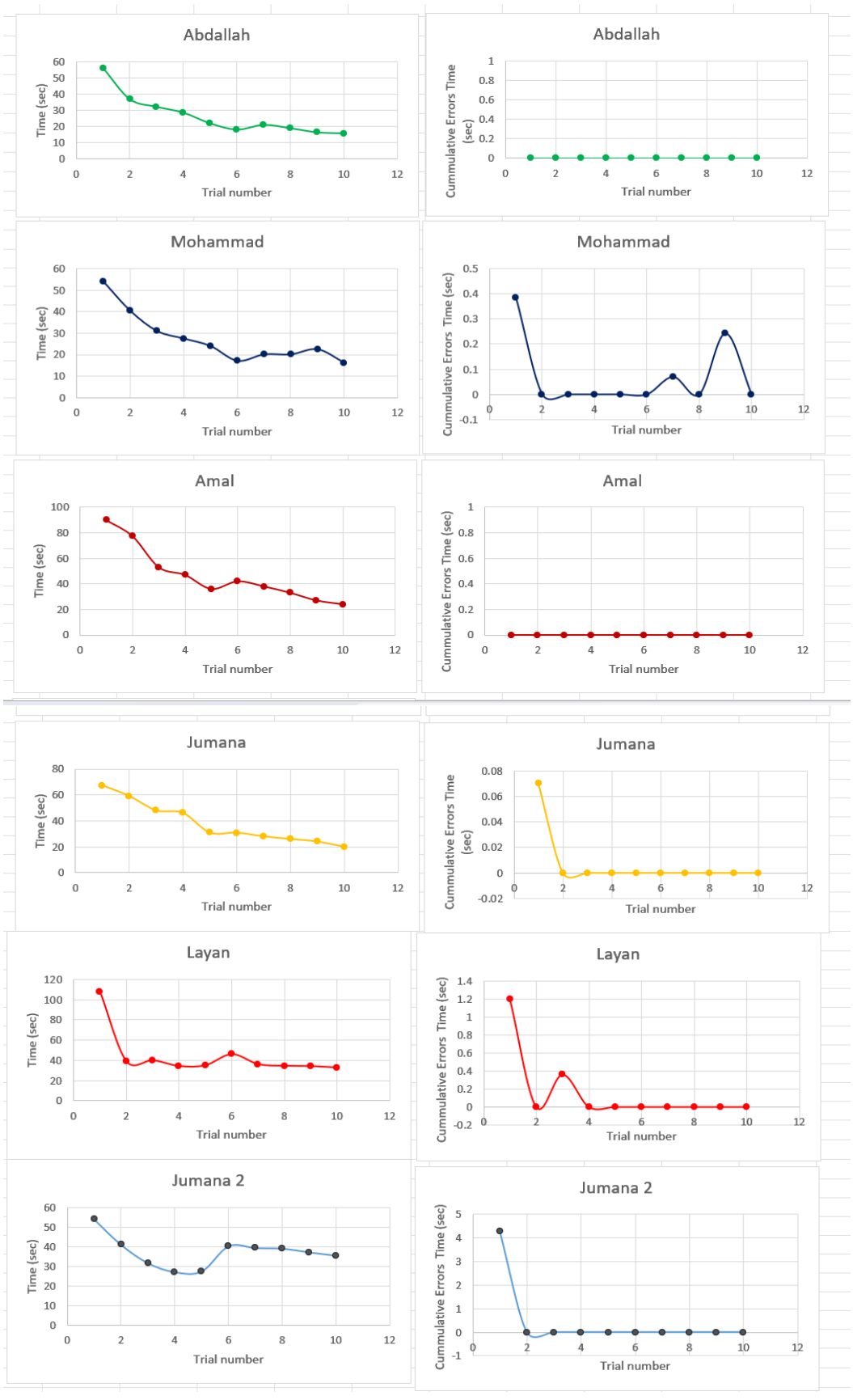
1. Place the pointer on the bottom of the star.
2. Turn on the stopwatch.
3. Moving the pointer in the counter clockwise direction around the star. The movement of the pointer around the star should be as quickly as possible and making few contacts (errors) as possible.
4. When the client returns the pointer on the bottom of the star, stop the stopwatch. Record the time required (in seconds) to finish the counter clockwise operation and the total number of errors on the counter for the counter clockwise operation and the error time.
5. Repeat it 10 times.

Tables and figures:

Name	Trail number	Time (sec)	Number of errors	Error's Time/Trial
Abdallah Assad	1	56	0	--
	2	36.8	0	--
	3	32.1	0	--
	4	28.5	0	--
	5	21.9	0	--
	6	18.1	0	--
	7	21	0	--
	8	18.9	0	--
	9	16.4	0	--
	10	15.8	0	--
Mean		26.55	0	--
Std. dev		12.507	0	--
Mohammad Bassam	1	54	1	0.383
	2	40.4	0	--
	3	31	0	--
	4	27.5	0	--
	5	24	0	--
	6	17.1	0	--
	7	20.1	1	0.07
	8	20.1	0	--
	9	22.5	1	0.243
	10	16.2	0	--
Mean		27.29	0.3	0.232
Std. dev		11.847	0.483	0.157
Amal	1	90	0	--
	2	77.4	0	--
	3	53	0	--
	4	47	0	--
	5	36	0	--
	6	42	0	--
	7	38	0	--
	8	33	0	--
	9	27	0	--
	10	24	0	--
Mean		46.74	0	--
Std. dev		21.501	0	--

Record of The time required (in seconds) to finish each operation alone, and the total number of errors on the counter for each operation alone.

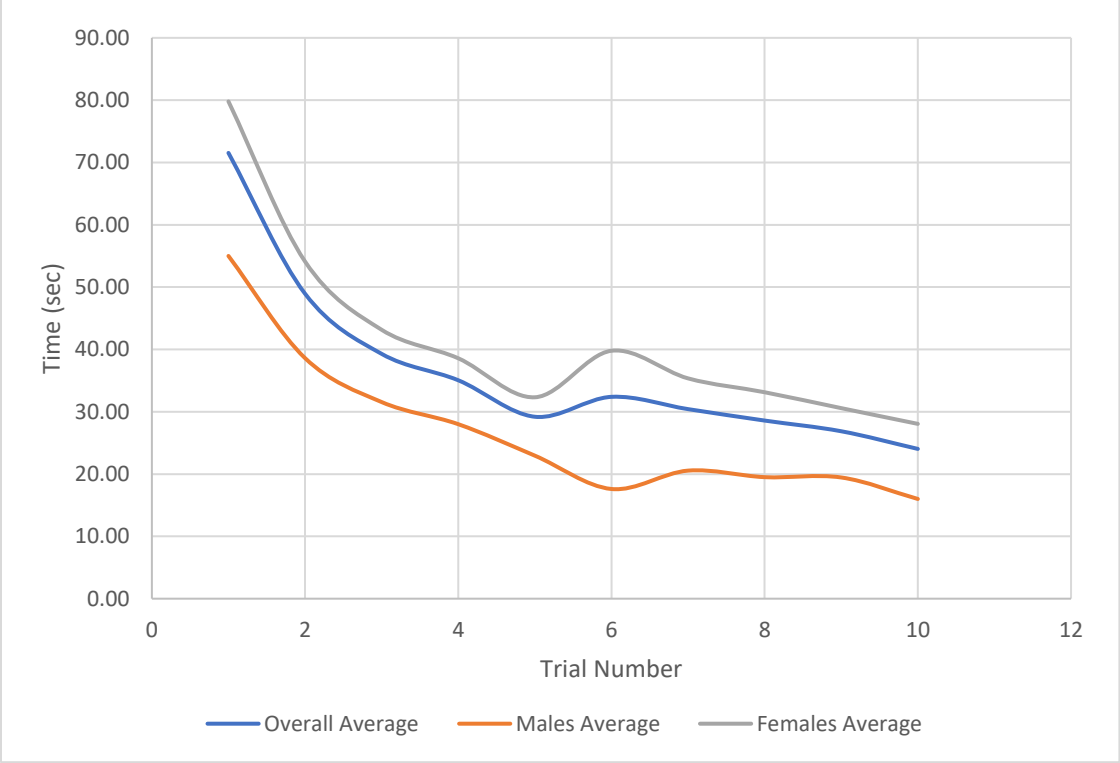
Jumana	1	67.2	1	0.07
	2	59	0	--
	3	48	0	--
	4	46	0	--
	5	30.87	0	--
	6	30.85	0	--
	7	28	0	--
	8	26	0	--
	9	24	0	--
	10	20	0	--
Mean		37.992	0.1	0.07
Std. dev		16.068	0.316	--
layan	1	108	1	1.2
	2	39	0	--
	3	40	1	0.36
	4	34.3	0	--
	5	35	0	--
	6	46	0	--
	7	36.1	0	--
	8	34.5	0	--
	9	34.2	0	--
	10	32.8	0	--
Mean		43.99	0.2	0.78
Std. dev		22.828	0.422	0.5939697
Jumana 2	1	54	4	4.3
	2	41	0	--
	3	31.6	0	--
	4	27	0	--
	5	27.4	0	--
	6	40.29	0	--
	7	39.3	0	--
	8	39	0	--
	9	37.1	0	--
	10	35.4	0	--
Mean		37.209	0.4	4.3
Std. dev		7.807	1.265	--
Overall Mean		**36.63**	**0.17**	**1.35**
Overall Std. Dev.		**17.40**	**0.59**	**1.53**



Learning curve ,and Cumulative errors time curve

Trial	Overall Average	Males Average	Females Average
1	71.53	55.00	79.80
2	48.93	38.60	54.10
3	39.28	31.55	43.15
4	35.05	28.00	38.58
5	29.20	22.95	32.32
6	32.39	17.60	39.79
7	30.42	20.55	35.35
8	28.58	19.50	33.13
9	26.87	19.45	30.58
10	24.03	16.00	28.05
standard time	25.00	18.00	30.00

learning curve for the data(overall average, males average, and females average)



Discussion and Conclusion:

- Males have less time of each trial than females.
- Males have a smaller number of errors than females.
- Variability of male's data is less and better than females.
- The best performance was for Abdallah, a male who is used to focus during using his both hands in a lot of daily life activities.

	Standard time	**Average std time**
Males	**18**	**25**
Females	**30**	

The effect on the learning curve?

There are many reasons:

1-Gender
2-condition of muscles
3- males take it as a challenge.
4- In addition,

Males are used to do muscular activity and control critical things (driving, loading, handling, etc.), by their both dominant and non dominant hands (as in this experiment), that helped them to score better numbers in this experiment