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EDTC 877 – Project 1

Scenario 1:

A statewide survey was conducted to assess the use of technology in schools. 50 technology coordinators in the state of New Jersey were asked to participate; a smaller participation rate was eventually analyzed ($n = 15$).

The number of years a teacher was in his or her position varied for each technology coordinator. Of the 15 respondents, the arithmetic mean and median of years in position was calculated. Although the central tendencies were close ($M = 5.93$ and *Median = 5.00*), the standard deviation revealed data that was further away from the middle. The range of years taught was 14, resulting in a $SD = 4.91$.

When compared to the number of students taught, the number of teachers in each of the technology coordinator's school varied. Because teachers typically work with groups of students, the central tendency of the number of teachers ($M = 40.73$, *Median = 43.00*) was lower than that of the students ($M = 311.33$, *Median = 300.00*). The standard deviation was greater for the students, $SD = 125.97$, than that of the teachers, SD = *17.46.* Of course, each number is relative to the range of the groups measured. Accordingly, the range of students was as high, at 480, compared to the range of teachers: 61.

Correlation of years in position to numbers of students and teachers, and to self-reported job satisfaction levels, was tested (Table 1.1). There was a moderate relationship correlated between job satisfaction and number of students. There was a weak or no relationship between the other sets of data.

Table 1.1

Correlations of years in position, numbers of teachers and students, and job satisfaction.

		Years	Teacher	Students	Satisfaction
Years	Pearson Correlation	1	.241	.208	.038
	Sig. (2-tailed)		.387	.457	.894
	N	15	15	15	15
Teacher	Pearson Correlation	.241	1	.708**	.173
	Sig. (2-tailed)	.387		.003	.538
	N	15	15	15	15
Students	Pearson Correlation	.208	.708**	1	.425
	Sig. (2-tailed)	.457	.003		.114
	N	15	15	15	15
Satisfaction	Pearson Correlation	.038	.173	.425	1
	Sig. (2-tailed)	.894	.538	.114	
	N	15	15	15	15

**. Correlation is significant at the 0.01 level (2-tailed).

Next, the survey instrument coded responses for the technology coordinator's device preference ($n = 15$). Regarding iPads, coded as 1, the mode was 4. Surfaces, coded as 2, had a mode of 11 (Table 1.2). In other words, 73.30% of those surveyed preferred Surfaces.

Table 1.2

Preferred device

Device		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1 (iPad)	11	73.3	73.3	73.3
	2 (Surface)	4	26.7	26.7	100.0
Total		15	100.0	100.0	

Similar to device preference, needs were assessed and coded (*n=15*). For MS Office, the mode was 2; for Adobe Captivate, the mode was 3; for robotics, the mode was 6; and the mode for 3D printing was 1 (Table 1.3). 40% of those surveyed needed robotics, while the other 40% needed Adobe Captivate and Smart Board combined.

Table 1.3

Need, in regards to what teachers need to know

Need		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1 (MS Office)	2	13.3	13.3	13.3
	2 (Adobe Captivate)	3	20.0	20.0	33.3
	3 (Robotics)	6	40.0	40.0	73.3
	4 (3D Printing)	1	6.6	6.6	80.0
	5 (Smart Boards)	3	20.0	20.0	100.0
Total		15	100.0	100.0	

Technology coordinators self-reported their job satisfaction based on a scale of 0 through 5, with 5 indicating "very satisfied." Regarding the central tendency of the technology coordinator's job satisfaction, *M = 3.13, Median = 3.00.* The standard deviation (*SD = 1.60*) indicates a variance from the central tendency of the data. The responses ranged 1 through 5 (no one answered 0, which was an option).

After analysis of the data collected, recommendations to assist in best practices in Intro to Ed Tech courses can be made. The Surface is the more desired platform, while robotics is in the most need. Both should be considered. Adobe Captivate and Smart Boards should also be integrated in the courses. Both technologies are used to present material; Captivate for distance learning and Smart Boards for face-to-face presentations. The number of teachers grows with the number of students, which indicates an increase of students who take Intro to Ed Tech. There is a positive correlation.

Scenario 2:

In researching the trends of technology usage from instructional designers, several data points were collected. The goal is to inform the department's decisions of choosing technology. In addition to technology questions, the sample (*n = 19*) was asked their age, income, and years in the field. Age and income values were spread out from the central point. Regarding age, the standard deviation indicates a wide variance from the central tendency of the data (*M = 39.00, Median = 38.00*, *SD = 11.01*). For income, in dollars, there was also a variance spread out wide from the central points (*M = 79,105.30, Median = 80,000.00,* with a *SD = 19,037.70*). Years in field were closer to the central point of the data collected (*M = 4.16, Median = 4.00, SD = 0.76*).

Due to the nominal characteristics of the data sets, responses for platform and software were coded (both *n = 19*). The mode for Mac was 5, compared to a mode for PC of 14 (Table 2.1). Mac was coded as 1, PC as 2. 73.70% preferred PC to Mac. Regarding software, the mode for Captivate was 13, while the mode for Storyline was 6 (Captivate was coded as 1, Storyline as 2). 68.42% prefer Captivate as the software tool (Table 2.2). Furthermore, there was no correlated relationship between the aforementioned data points and platform and software considerations (see Table 2.3).

Table 2.1

Frequency table for platform.

Device		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1 (Mac)	5	26.3	26.3	26.3
	2 (PC)	14	73.7	73.7	100.0
Total		19	100.0	100.0	

Table 2.2

Frequency table for software.

Software		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1 (Captivate)	13	68.4	68.4	68.4
	2 (Storyline)	6	31.6	31.6	100.0
Total		19	100.0	100.0	

The researcher used SPSS to test for correlation of each tested field (Table 2.3). There was a strong relationship between age and years in field. The relationship between satisfaction and income was moderate. The correlation between both platform and software were weak compared to the other tested fields.

Table 2.3

Correlation of age, income, years in field, job satisfaction, preferred platform, software.

		Age	Income	Years	Satisfaction	Platform	Software
Age	Pearson Correlation	1	.473*	.689**	.244	.078	.275
	Sig. (2-tailed)		.041	.001	.314	.751	.255
	N	19	19	19	19	19	19
Income	Pearson Correlation	.473*	1	.660**	.415	-.061	.216
	Sig. (2-tailed)	.041		.002	.077	.804	.374
	N	19	19	19	19	19	19
Years	Pearson Correlation	.689**	.660**	1	.352	-.006	.161
	Sig. (2-tailed)	.001	.002		.139	.979	.509
	N	19	19	19	19	19	19
Satisfaction	Pearson Correlation	.244	.415	.352	1	-.194	.160
	Sig. (2-tailed)	.314	.077	.139		.425	.513
	N	19	19	19	19	19	19

Platform	Pearson Correlation	.078	-.061	-.006	-.194	1	.149
	Sig. (2-tailed)	.751	.804	.979	.425		.543
	N	19	19	19	19	19	19
Software	Pearson Correlation	.275	.216	.161	.160	.149	1
	Sig. (2-tailed)	.255	.374	.509	.513	.543	
	N	19	19	19	19	19	19

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

The survey instrument assessed job satisfaction. Instructional designers self-reported answers based on a scale of 0 through 5, with 5 indicating, "very satisfied." The responses ranged 3 through 5, with *M = 4.15, Median = 4.00.* This indicates that instructional designers were satisfied to very satisfied, with no outlier data. The standard deviation (*SD = 0.76*) indicates that the data was not spread out from the central point. The average and median were indicative of the collected scores.

Based on the descriptive statistics, trends in technology usage emerge. The recommendations that follow are intended to inform the department's decisions on selecting technology in the future. There is a strong correlated relationship between age, income, and years in field. This indicates that current instructional designers are experienced in the field and are paid based on their longevity. In other words, as each variable increases, so do the others. There is, however, a moderate relationship between job satisfaction and income. It is in the best interest of the department to continue staffing as it is, with more experienced professionals whose salary increase based on job experience.

Scenario 3:

A survey was conducted to assess the effectiveness of robotics instruction on computer programming. The research was administered at a local middle school. The intent is to gauge the effectiveness of robotics instruction on computer programming at the school.

Although there was a sample of 24, one student did not take the pretest. It cannot be determined if that student's score changed from pretest to posttest. That student was removed from the data set. Therefore, the numbers analyzed are based on the other students (*n = 23*). Regarding grade level, 4.30% were in 9th grade; the largest group was 7th grade, at 39.1% of the data (see Table 3.1).

Table 3.1

Grade Level

Grade Level		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	6th	6	26.1	26.1	26.1
	7th	9	39.1	39.1	65.2
	8th	7	30.4	30.4	95.7
	9th	1	4.3	4.3	100.0
Total		23	100.0	100.0	

The researcher assessed satisfaction, engagement, and motivation, on a scale from 0 through 5, with 5 being the highest. Regarding satisfaction, scores were fairly high (*M = 4.09, Median = 5.00*). The standard deviation is relatively low (*SD = 1.16*), which indicates a lack of outlier, or extreme scores. Similar to satisfaction, central tendency scores for engagement were high (*M = 4.48, Median = 5.00*), with most of the data at the central point (*SD = 0.79*). Regarding motivation, data was more spread. The central tendency was lower than satisfaction and engagement (*M = 3.73, Median = 3.00*) and the data was more wide spread (*SD = 1.94*). Most of the students were satisfied and engaged, but not all were necessarily satisfied.

The number of technology devices used at home was assessed. Regarding number of devices, *M = 3.74, Median = 3.00,* and *SD = 1.94.* A closer review of the data revealed outliers; one student had no devices at home, while 2 students had 7 devices.

Table 3.2

Number of devices at home.

# of Devices		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	1	4.3	4.3	4.3
	2.00	7	30.4	30.4	34.8
	3.00	4	17.4	17.4	52.2
	4.00	3	13.0	13.0	65.2
	5.00	2	8.7	8.7	73.9
	6.00	4	17.4	17.4	91.3
	7.00	2	8.7	8.7	100.0
Total		23	100.0	100.0	

A pretest and posttest was conducted; it was out of 100 points. Compared to the pretest range of 79, the posttest range was smaller: 28. The lowest posttest score was 71, compared to 12 for the pretest, which was an outlier score. Results show a rise in pretest and posttest scores, based on two different indicators of central tendency: *M = 51.83* on the pretest, compared to *M = 87.74* on the posttest. The median also increased: on the pretest, *Median = 52.00,* while the posttest, *Median = 92.00.* Not only did the central tendency points increase, the standard deviations decreased. The standard deviation on the pretest was 22.82, *SD = 8.83* on the posttest. This indicates that the mean distance from the central points was small in the posttest, which suggests a smaller spread of outlier data.

When test scores were charted, using SPSS, the pretest showed normal kurtosis, with the exception of outlier data in lower scores (Figure 3.1). The posttest was negatively skewed, with most of the distributions peaking toward the higher score (Figure 3.2). Based on the charts, as well as the descriptive statistical data, student scores were consistently higher in the posttest. Moreover, the negative skew of the posttest score indicates that computer-based, robotics instruction was effective.

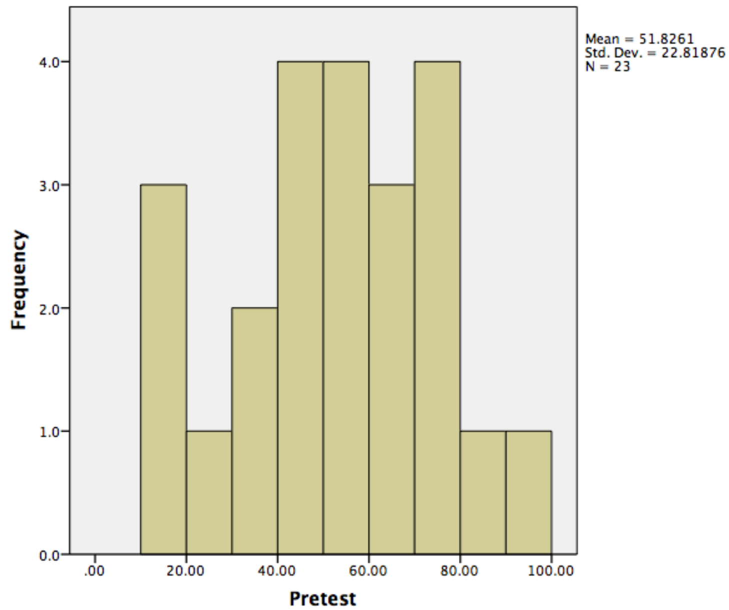

Figure 3.1. Pretest scores by grade.

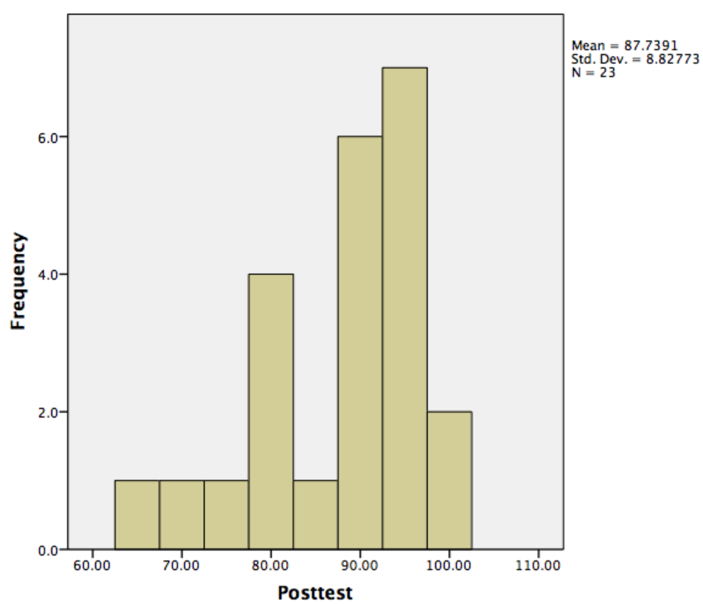

Figure 3.2. Posttest scores by grade.

The central point of data for multiple devices at home had an arithmetic mean on 3.74. Most students had technology device access at home—even when considering the standard deviation (*SD = 1.94*). The number of devices was next correlated to the pretest scores (Table 3.1). There was also a weak relationship from having at-home devices and the pretest scores; however, there was a moderate relationship between number of devices and the posttest. There was a weak relationship between grade level and the other categories—including engagement.

Table 3.1

Correlation of grade level, pretest, posttest, engagement and number of devices at students' home.

Correlations

		Grade	Pretest	Posttest	Engagement	Devices
Grade	Pearson Correlation	1	.153	.259	.037	-.168
	Sig. (2-tailed)		.487	.232	.865	.443
	N	23	23	23	23	23
Pretest	Pearson Correlation	.153	1	.521*	.070	.299
	Sig. (2-tailed)	.487		.011	.750	.165
	N	23	23	23	23	23
Posttest	Pearson Correlation	.259	.521*	1	-.092	.121
	Sig. (2-tailed)	.232	.011		.676	.583
	N	23	23	23	23	23
Engagement	Pearson Correlation	.037	.070	-.092	1	-.093
	Sig. (2-tailed)	.865	.750	.676		.673
	N	23	23	23	23	23
Devices	Pearson Correlation	-.168	.299	.121	-.093	1
	Sig. (2-tailed)	.443	.165	.583	.673	
	N	23	23	23	23	23

*. Correlation is significant at the 0.05 level (2-tailed).

Scenario 4:

Research was conducted on graduation rates of a graduate program. Results were coded to show that 16 completed the program, while 4 did not ($n = 20$). The survey also asked if the student worked full-time. This data point could correlate to graduating rates; however, the data sets provided simply showed a 1 or 2—no distinction was given stating which was a yes or a no. As a result, the data for this category could not be analyzed or correlated to the other results.

Regarding GRE test scores, on a scale out of 1,000, $M = 699.50$ and *Median = 835.00.* The standard deviation ($SD = 318.01$) indicates a wide spread of data points from the central tendency. This is due to extreme scores. A closer look at the data points reveal an outlier at 120, compared to 9 scores over 900. GRE scores were negatively skewed (Figure 4.2).

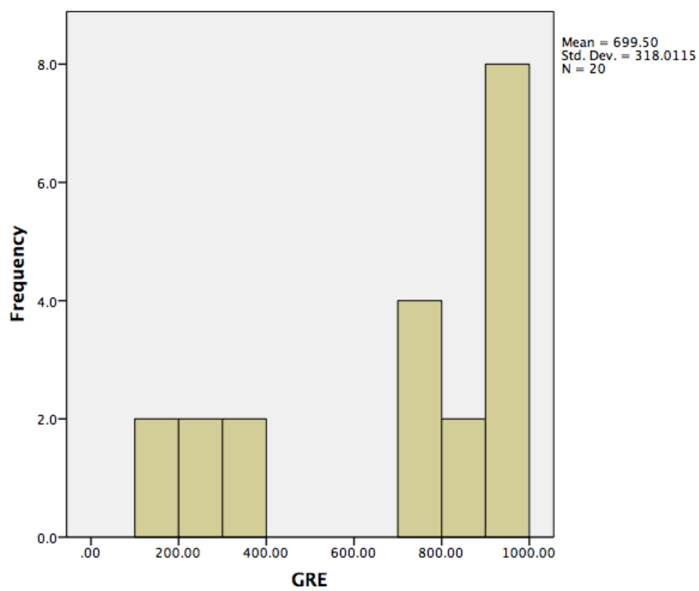

Figure 4.1. GRE scores.

The GPA, which is the grade point average, based on a 4 point scale, also varied: $M = 3.27$, *Median* $= 3.27$. The data was mostly clustered around the central points ($SD = 0.38$). Data was entered into SPSS to test for correlation of GPA, GRE, and program completion (Table 4.2). GPA scores followed a bell-shaped curve (Figure 4.2).

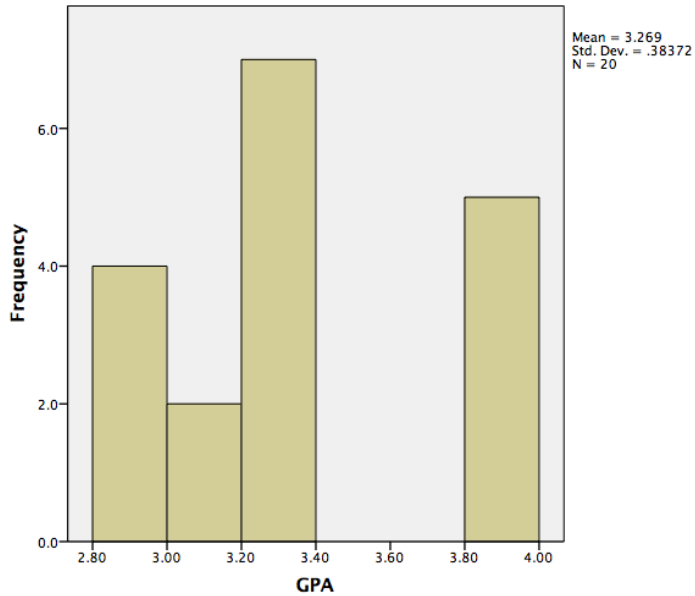

Figure 4.2. GPA scores.

The GRE is the standardized test used for entering graduate school. GPA represents the average of graded assessments while in the program. When compared on a scatterplot, a strong positive, but not a direct relationship is observed between the two variables (Figure 4.3). For the most part, both scores increased together.

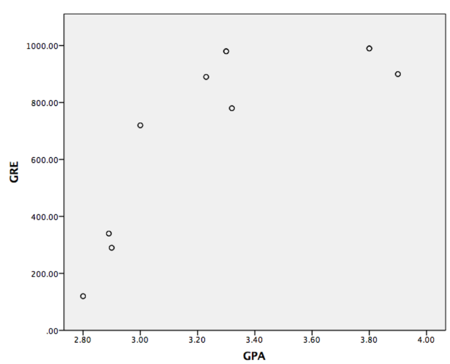

Figure 4.3. GPA and GRE scores.

SPSS software running a correlation analysis revealed a strong relationship between GRE scores and GPA. Because SPSS generated a negative Pearson correlation value between completion and both GRE and GPA, it can be concluded that when GRE and GPA scores increase, completion decreases. Excluding student working (due to incomplete coded descriptors for yes or no) graduation rates had no correlation to GPA or GRE scores (Table 4.2). Perhaps there are other factors affecting completion than GRE and GPA scores.

Table 4.1

Correlation of GRE, GPA, and completion of program.

		GRE	GPA	Completed
GRE	Pearson Correlation	1	.795**	-.798**
	Sig. (2-tailed)		.000	.000
	N	20	20	20
GPA	Pearson Correlation	.795**	1	-.560*
	Sig. (2-tailed)	.000		.010
	N	20	20	20
Completed	Pearson Correlation	-.798**	-.560*	1
	Sig. (2-tailed)	.000	.010	
	N	20	20	20

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).