HCI Assignment

Part A

Scenario 1:

1) Assumptions:
- All participants have some level of familiarity with playing computer games.
- The computer game's source code can be modified to capture relevant data for analysis.
- The performance in playing the game can be objectively measured (e.g., score, response time, accuracy).

2) Experiment Hypothesis (H1):
1. There is a significant difference in game performance among the joystick, mouse, and touchpad input methods.
2. There is a significant difference in game performance between males and females.

3) Null Hypothesis (H0):
1. There is no significant difference in game performance among the joystick, mouse, and touchpad input methods.
2. There is no significant difference in game performance between males and females.

4) Trial Description:
Participants will be asked to play a computer game using each input method (joystick, mouse, touchpad) in a randomized order. The game will be designed to capture relevant performance metrics, such as score, response time, and accuracy. The order of input methods will be counterbalanced to control for order effects.

5) Subject Design:
Between-subject design (different participants for each input method).

6) Independent Variable(s) and Levels:

1. Input Method
   - Joystick
   - Mouse
   - Touchpad
2. Gender
   - Male
   - Female

7) Dependent Variable(s):
Game performance metrics (e.g., score, response time, accuracy).

Control Variable(s) and Procedure(s):
- Game difficulty: The difficulty level of the game will be kept constant across all trials to ensure that any observed differences are due to the input method and not the game's complexity.
- Randomization: The order of the input methods will be randomized to control for order effects.
- Game environment: Ensure consistent gaming conditions (lighting, noise level, etc.) for all participants.

8) Statistical Test:
1. For comparing input methods: One-way Analysis of Variance (ANOVA) to determine if there are significant differences in game performance among the joystick, mouse, and touchpad groups.
2. For comparing gender differences: Independent samples t-test to assess if there are significant differences in game performance between males and females.

9) Justification for Statistical Test:
ANOVA is suitable for comparing means of three or more groups, and it helps identify whether there are any significant differences among the input methods. Independent samples t-test or Mann-Whitney U test is appropriate for comparing two independent groups (males and females) in terms of game performance. The choice between t-test and Mann-Whitney U test depends on the distribution of the data.

Scenario 2:

1) Assumptions:

- Users of the e-commerce website have varying levels of familiarity with the platform.
- Ad placement significantly impacts user engagement and click-through rates.
- The content of the advertisement is the same for both locations.

2) Experiment Hypothesis (H1):

The placement of the advertisement on Location A will result in a higher user engagement and click-through rate compared to Location B.

3) Null Hypothesis (H0):

There is no significant difference in user engagement and click-through rate between Location A and Location B.

4) Trial Description:

Users will be randomly assigned to one of two groups. Group A will see the advertisement in Location A, while Group B will see the advertisement in Location B. User interactions, such as click-through rates and time spent on the website, will be recorded for analysis.

5) Subject Design:

Between-subject design (different participants for each location).

6) Independent Variable(s) and Levels:

1. Ad Placement
   - Location A
   - Location B

7) Dependent Variable(s):

User engagement metrics:

- Click-through rate
- Time spent on the website

Control Variable(s) and Procedure(s):
- Advertisement content: Ensure the content of the advertisement is the same for both locations.
- Randomization: Randomly assign users to one of the two groups to control for user-specific factors.
- Time of exposure: Ensure that users in both groups are exposed to the advertisement at the same time to avoid potential temporal biases.

8) Statistical Test:
Independent samples t-test to compare user engagement metrics (click-through rate, time spent on the website) between Location A and Location B.

9) Justification for Statistical Test:
The chosen statistical test will assess whether there is a significant difference in user engagement metrics between the two groups. Independent samples t-test is appropriate for normally distributed data,

Scenario 3:

1) Assumptions:
1. Visual Acuity: Users have varying visual acuity, and font size may impact message readability differently for different individuals.
2. Font Preference: User preferences for font typeface may vary based on personal preferences, reading habits, and familiarity.
3. Message Location Impact: The impact of message location on user attention and comprehension is assumed to vary.
4. Device Consistency: The experiment assumes consistency in the display capabilities of the digital dashboard across different car models and manufacturers.
5. Message Length: The experiment assumes that messages are of a standard length and that variations in font size, typeface, and location do not significantly impact the length of the messages.

2) Experiment Hypothesis (H1):
1. The font size significantly affects message readability and comprehension.

2. The font typeface significantly influences user preferences and message understanding.
3. The message location has a significant impact on user attention and response.

3) Null Hypothesis (H0):

1. Font size does not significantly affect message readability and comprehension.
2. Font typeface has no significant influence on user preferences and message understanding.
3. Message location does not have a significant impact on user attention and response.

4) Trial Description:

Participants will be exposed to digital dashboard displays featuring variations in font size, typeface, and message location. They will be asked to perform specific tasks related to interpreting the displayed messages. Performance metrics, such as response time and accuracy, will be recorded.

5) Subject Design:

Within-subject design (each participant experiences all levels of font size, typeface, and message location).

6) Independent Variable(s) and Levels:

1. Font Size
   - Small
   - Medium
   - Large
   - Extra-large
2. Font Typeface
   - Arial
   - Times New Roman
   - Calibri
   - Verdana
3. Message Location
   - Centered at the top
   - Centered in the middle
   - Centered at the bottom

- Left-aligned at the top
- Left-aligned in the middle
- Left-aligned at the bottom
- Right-aligned at the top
- Right-aligned in the middle

7) Dependent Variable(s):

User performance metrics:
- Response time
- Accuracy in interpreting messages

Control Variable(s) and Procedure(s):
- Standardized Messages: Ensure that the content and complexity of messages are consistent across all variations.
- Randomization: Randomize the order in which participants experience the different font sizes, typefaces, and message locations to control for order effects.
- Car Simulator Environment: Create a simulated driving environment to mimic real-world conditions.
- Counterbalancing: Counterbalance the order of font size, typeface, and message location variations to control for potential biases.

8) Statistical Test:

1. Two-way repeated-measures ANOVA to assess the impact of font size and typeface on user performance.
2. One-way repeated-measures ANOVA to evaluate the effect of message location on user performance.

9) Justification for Statistical Test:

ANOVA is appropriate for analyzing the impact of multiple independent variables with multiple levels on dependent variables. Repeated-measures design is suitable as it involves measuring the same participants under different conditions. The chosen statistical tests will help identify significant differences and interactions between font size, typeface, and message location in influencing user performance on the digital dashboard.

Scenario 4:

1) Assumptions:

1. Salary Distribution: The assumption is that customers receive their salaries at the beginning of the month, and this has an impact on their purchasing behavior.
2. Job Type Influence: Different job types (A, B, C) may have distinct spending patterns, and this could affect purchasing behavior.
3. Product Category Impact: The assumption is that certain product categories may be more appealing or essential to customers at the beginning of the month.
4. Consistent Website Traffic: The experiment assumes consistent website traffic during the testing period.
5. Job Type Categorization: Job types A, B, and C are broad categories that capture the diversity of the customer base.
6. Product Category Relevance: Products within each category are assumed to be relevant and appealing to customers throughout the month.
7. Product Availability: The availability of products within each category is consistent throughout the month.
8. Customer Familiarity: Customers are familiar with the product categories and can make informed purchasing decisions.
9. Purchase Volume Measurement: Purchase volume is measured in terms of the number of items bought or the total monetary value of purchases.

2) Experiment Hypothesis (H1):

There is a significant correlation between the volume of purchases and the day of the month, with higher purchase volumes observed at the beginning of the month.

3) Null Hypothesis (H0):

There is no significant correlation between the volume of purchases and the day of the month; purchase volumes are consistent throughout the month.

4) Trial Description:

Data on customer purchases will be collected and analyzed based on the day of the month, job type (A, B, C), and product category. The experiment will span multiple months to capture variations over time.

5) Subject Design:
Between-subject design for job types (A, B, C) and within-subject design for the day of the month.

6) Independent Variable(s) and Levels:
1. Day of the Month (Independent Variable)
2. Job Type (Independent Variable)
   - A
   - B
   - C
3. Product Category (Independent Variable)
   - Category 1
   - Category 2
   - Category 3
   - Category 4
   - Category 5

7) Dependent Variable(s)
Purchase volume (number of items bought or total monetary value of purchases).

Control Variable(s) and Procedure(s):*
- Product Availability: Ensure that products within each category are consistently available throughout the month.
- Marketing Campaigns: Minimize the impact of marketing campaigns on purchase volumes during the experiment period.
- Consistent Pricing: Keep product prices consistent during the experiment to avoid price-related biases.

8) Statistical Test:
1. ANOVA test to assess if there are significant differences in purchase volumes among job types.
2. ANOVA test to evaluate if there are significant differences in purchase volumes among product categories.

9) Justification for Statistical Test:

Correlation analysis is used to examine the strength and direction of the relationship between two continuous variables (day of the month and purchase volume). ANOVA test is appropriate for analyzing differences in purchase volumes across job types and product categories, depending on the normality of the data. This test will help determine whether significant variations exist in purchasing behavior based on the specified independent variables.

Scenario 5:

1) Assumptions:

1. Mobile Game Appeal: It is assumed that certain mobile games are more appealing to specific demographics based on gender and age.
2. Mobile Device Compatibility: The experiment assumes that the selected games are compatible with various mobile device types.
3. User Familiarity: Participants are assumed to have a basic familiarity with mobile gaming.
4. Genre Relevance: The assumption is that the two selected game genres are relevant and recognizable to participants.
5. Consistent Game Experience: The gameplay experience is assumed to be consistent for both game genres.
6. Age Group Categories: Age groups are categorized in a way that captures relevant developmental stages (e.g., young adults, middle-aged adults, older adults).
7. Objective Measurement of Playing: The experiment assumes that playing mobile games can be objectively measured in terms of frequency or duration.
8. Gender Classification: The gender categories (male, female) are assumed to be inclusive and reflective of the participants' identities.

2) Experiment Hypothesis (H1):

There is a significant relationship between gender, age, mobile type, and the frequency/duration of playing mobile games. Additionally, there may be differences in mobile gaming preferences based on game genres.

3) Null Hypothesis (H0):

There is no significant relationship between gender, age, mobile type, and the frequency/duration of playing mobile games. Game genre has no impact on mobile gaming preferences.

4) Trial Description:

Participants will be recruited across different age groups and genders. They will be asked to play mobile games from two genres on their own mobile devices. Data on the frequency/duration of gameplay, mobile device type, and gender will be collected.

5) Subject Design:

Between-subject design for gender and age groups. Within-subject design for game genres and mobile device types.

6) Independent Variable(s) and Levels:

1. Gender
   - Male
   - Female
2. Age Group
   - Young Adults
   - Middle-aged Adults
   - Older Adults
3. Mobile Type
   - Smartphone
   - Tablet
4. Game Genre
   - Genre 1
   - Genre 2

7) Dependent Variable(s):

Frequency/duration of playing mobile games.

Control Variable(s) and Procedure(s):
- Game Familiarity: Ensure that participants are familiar with the selected game genres.
- Consistent Instructions: Provide participants with consistent instructions for playing the games.
- Device Compatibility: Confirm that the selected games are compatible with both smartphones and tablets.

- Random Assignment: Randomly assign participants to different game genres to control for order effects.

8) Statistical Test:

1. Multiple regression analysis to assess the relationship between gender, age, mobile type, and the frequency/duration of playing mobile games.
2. Analysis of variance (ANOVA) to determine if there are significant differences in playing frequency/duration across different game genres.

9) Justification for Statistical Test:

Multiple regression analysis is suitable for exploring the relationship between multiple independent variables and a dependent variable. ANOVA is appropriate for comparing means across different groups, such as game genres. These statistical tests will help identify whether there are significant correlations and differences in mobile gaming behavior based on gender, age, mobile type, and game genre.

Scenario 6:

1) Assumptions:

1. Attendance Impact: The assumption is that attending both the lecture and the tutorial directly contributes to better understanding of the course material.
2. Consistent Teaching Quality: The experiment assumes consistent teaching quality in both the lecture and tutorial sessions.
3. Homogeneity of Course Material: The content covered in both the lecture and tutorial is assumed to be relevant and equally significant for academic success.
4. Equal Participation: Students are assumed to actively participate in both the lecture and tutorial sessions.
5. Grade Measurement Validity: The experiment assumes that the grade accurately reflects the students' understanding and mastery of the course material.
6. Class Size Consistency: The experiment assumes similar class sizes for both the lecture and tutorial sessions.

7. Timely Feedback: Timely feedback on assignments and assessments is assumed to be available to students.

2) Experiment Hypothesis (H1):
Attending both the lecture and the tutorial will result in a statistically significant improvement in overall course grades compared to attending only one of the sessions or none at all.

3) Null Hypothesis (H0):
There is no significant difference in overall course grades between students who attend both the lecture and tutorial and those who attend only one or none of the sessions.

4) Trial Description:
Students will be randomly assigned to different groups:
1. Group A: Attend both lecture and tutorial sessions.
2. Group B: Attend only the lecture sessions.
3. Group C: Attend only the tutorial sessions.
4. Group D: Do not attend any sessions.

Data on student attendance, grades, and other relevant factors will be collected and analyzed.

5) Subject Design:*
Between-subject design with four groups representing different attendance conditions.

6) Independent Variable(s) and Levels:
1. Attendance
   - Group A: Both lecture and tutorial
   - Group B: Only lecture
   - Group C: Only tutorial
   - Group D: No attendance

7) Dependent Variable(s):

Overall course grades.

Control Variable(s) and Procedure(s):
- Consistent Content: Ensure that the content covered in both the lecture and tutorial is consistent and equally relevant to the course.
- Random Assignment: Randomly assign students to different attendance groups to control for individual differences.
- Grading Consistency: Maintain consistency in grading criteria and practices across all students.
- Anonymous Participation: Encourage students to participate in a way that their attendance is not easily recognizable to the instructors.

8) Statistical Test:
Analysis of variance (ANOVA) test (depending on the normality of the data) to compare overall course grades across the different attendance groups.

9) Justification for Statistical Test:
ANOVA is suitable for comparing means across multiple groups to determine if there are significant differences. The chosen statistical test will help identify whether attending both the lecture and tutorial has a significant impact on overall course grades.

Scenario 7:

1) Assumptions:
1. Hand Size Consistency: The assumption is that the classification of hand sizes (tiny, small, medium, large) accurately represents users' hand dimensions.
2. Mouse Size Relevance: The experiment assumes that users' comfort with mouse sizes is directly influenced by the compatibility between their hand size and the mouse size.

3. Familiarity with Mice: Users are assumed to have a basic understanding and familiarity with using computer mice.
4. Task Performance: Comfort is assumed to be related to overall task performance and is reflected in users' subjective experiences.
5. Consistent Mouse Design: The experiment assumes that mice within each size category have consistent design features apart from size.

2) Experiment Hypothesis (H1):
User comfort with using a computer mouse is influenced by the compatibility between user hand size and mouse size. Specifically, users will report higher comfort levels when using a mouse size that matches their hand size classification.

3) Null Hypothesis (H0):
There is no significant difference in user-reported comfort levels across different mouse sizes, regardless of hand size.

4) Trial Description:
Participants will be classified into four hand size groups (tiny, small, medium, large) and will be asked to use computer mice of varying sizes (small, medium, large) for a set of standard tasks. Comfort ratings, task completion time, and any discomfort experienced will be recorded.

5) Subject Design:
Within-subject design (each participant experiences all mouse sizes).

6) Independent Variable(s) and Levels:
1. Hand Size
   - Tiny
   - Small
   - Medium
   - Large
2. Mouse Size
   - Small
   - Medium
   - Large

7) Dependent Variable(s):

User-reported comfort levels, task completion time, discomfort experienced.

Control Variable(s) and Procedure(s):
- Task Standardization: Standardize tasks to ensure consistency in evaluating performance across different mouse sizes.
- Randomization: Randomize the order in which participants use different mouse sizes to control for order effects.
- Counterbalancing: Counterbalance the order of hand size classifications and mouse sizes to control for potential biases.
- Consistent Desk Setup: Ensure that the desk setup, including chair height and monitor placement, is consistent for all participants.

8) Statistical Test:

1. Repeated-measures Analysis of Variance (ANOVA) to assess the impact of both hand size and mouse size on user-reported comfort levels.

9) Justification for Statistical Test:

Repeated-measures ANOVA is appropriate for analyzing differences in comfort levels across multiple conditions (hand size and mouse size combinations).

Part B

Statistical Analysis

In this section, screenshots will be provided for the flow analysis conducted on each game for the 9 flow components and then the overall comparison between the 3 games.

Each game was represented as a numeric value in the grouping variable "GameGroup" as follows:
1 → German Road Racer
2 → Vertigo
3 → Asphalt9

1-Merging actions and awareness (MAA):

Kruskal-Wallis Test

Ranks

	GameGroup	N	Mean Rank
MAA	1.00	20	28.70
	2.00	20	20.73
	3.00	20	42.08
	Total	60	

Test Statistics[a,b]

	MAA
Chi-Square	15.537
df	2
Asymp. Sig.	.000

a. Kruskal Wallis Test

b. Grouping Variable: GameGroup

According to the above tables, H(2) = 15.537 and the p value = 0.0, since the p value is less than 0.05 therefore we can conclude that there is significant difference between the 3 games in the MAA component and that game 3 (Asphalt9) has the highest mean.

2-Clear Goals (CG):

Kruskal-Wallis Test

Ranks

	GameGroup	N	Mean Rank
CG	1.00	20	26.73
	2.00	20	26.13
	3.00	20	38.65
	Total	60	

Test Statistics[a,b]

	CG
Chi-Square	6.668
df	2
Asymp. Sig.	.036

a. Kruskal Wallis Test

b. Grouping Variable: GameGroup

According to the above tables, H(2) = 6.668 and the p value = 0.036, since the p value is less than 0.05 therefore we can conclude that there is significant difference between the 3 games in the CG component and that game 3 (Asphalt9) has the highest mean.

3-Concentration on task at hand(CO):

Kruskal-Wallis Test

Ranks

	GameGroup	N	Mean Rank
CO	1.00	20	24.73
	2.00	20	28.90
	3.00	20	37.88
	Total	60	

Test Statistics[a,b]

	CO
Chi-Square	5.992
df	2
Asymp. Sig.	.050

a. Kruskal Wallis Test

b. Grouping Variable: GameGroup

According to the above tables, H(2) = 5.992 and the p value = 0.05, since the p value is equal to 0.05 therefore we can conclude that there is a slight difference between the 3 games in the CO component and that game 3 (Asphalt9) has the highest mean.

4-Unambiguous feedback(UF):

Kruskal-Wallis Test

Ranks

	GameGroup	N	Mean Rank
UF	1.00	20	24.05
	2.00	20	27.38
	3.00	20	40.08
	Total	60	

Test Statistics[a,b]

	UF
Chi-Square	9.827
df	2
Asymp. Sig.	.007

a. Kruskal Wallis Test

b. Grouping Variable: GameGroup

According to the above tables, H(2) = 9.827 and the p value = 0.007, since the p value is less than 0.05 therefore we can conclude that there is significant difference between the 3 games in the UF component and that game 3 (Asphalt9) has the highest mean.

5-Challenge-Skill Balance (CS):

Kruskal-Wallis Test

Ranks

	GameGroup	N	Mean Rank
CS	1.00	20	26.48
	2.00	20	28.33
	3.00	20	36.70
	Total	60	

Test Statistics[a,b]

	CS
Chi-Square	4.000
df	2
Asymp. Sig.	.135

a. Kruskal Wallis Test

b. Grouping Variable: GameGroup

According to the above tables, H(2) = 4.0 and the p value = 0.135, since the p value is greater than 0.05 therefore we can conclude that there is no significant difference between the 3 games in the CS component.

6-Time Transformation(TT):

Kruskal-Wallis Test

Ranks

	GameGroup	N	Mean Rank
TT	1.00	20	27.75
	2.00	20	28.05
	3.00	20	35.70
	Total	60	

Test Statistics[a,b]

	TT
Chi-Square	2.713
df	2
Asymp. Sig.	.258

a. Kruskal Wallis Test

b. Grouping Variable: GameGroup

According to the above tables, H(2) = 2.713 and the p value = 0.258, since the p value is greater than 0.05 therefore we can conclude that there is no significant difference between the 3 games in the TT component.

7-Self Consiousness (SC):

Kruskal-Wallis Test

Ranks

	GameGroup	N	Mean Rank
SC	1.00	20	26.30
	2.00	20	29.65
	3.00	20	35.55
	Total	60	

Test Statistics[a,b]

	SC
Chi-Square	2.959
df	2
Asymp. Sig.	.228

a. Kruskal Wallis Test

b. Grouping Variable: GameGroup

According to the above tables, H(2) = 2.959 and the p value = 0.228, since the p value is greater than 0.05 therefore we can conclude that there is no significant difference between the 3 games in the SC component.

8-Sense of Control(CN):

Ranks

	GameGroup	N	Mean Rank
CN	1.00	20	28.78
	2.00	20	25.30
	3.00	20	37.42
	Total	60	

Test Statistics[a,b]

	CN
Chi-Square	5.342
df	2
Asymp. Sig.	.069

a. Kruskal Wallis Test

b. Grouping Variable: GameGroup

According to the above tables, H(2) = 5.342 and the p value = 0.069, since the p value is greater than 0.05 therefore we can conclude that there is no significant difference between the 3 games in the CN component.

9-Autotelic Experience (AE):

Kruskal-Wallis Test

Ranks

	GameGroup	N	Mean Rank
AE	1.00	20	25.23
	2.00	20	27.28
	3.00	20	39.00
	Total	60	

Test Statistics[a,b]

	AE
Chi-Square	7.396
df	2
Asymp. Sig.	.025

a. Kruskal Wallis Test

b. Grouping Variable: GameGroup

According to the above tables, H(2) = 7.396 and the p value = 0.025, since the p value is less than 0.05 therefore we can conclude that there is significant difference between the 3 games in the AE component and that game 3 (Asphalt9) has the highest mean.

10- Overall Comparison:

Oneway

Descriptives

Overall

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum	Between-Component Variance
						Lower Bound	Upper Bound			
1.00		20	29.6375	7.44965	1.66579	26.1510	33.1240	15.42	39.42	
2.00		20	29.9875	6.52734	1.45956	26.9326	33.0424	9.00	38.50	
3.00		20	36.0875	4.70873	1.05290	33.8837	38.2913	25.92	45.00	
Total		60	31.9042	6.90305	.89118	30.1209	33.6874	9.00	45.00	
Model	Fixed Effects			6.33181	.81743	30.2673	33.5410			
	Random Effects				2.09411	22.8940	40.9144			11.15124

Test of Homogeneity of Variances

Overall

Levene Statistic	df1	df2	Sig.
2.221	2	57	.118

ANOVA

Overall

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	526.233	2	263.117	6.563	.003
Within Groups	2285.236	57	40.092		
Total	2811.470	59			

Robust Tests of Equality of Means

Overall

	Statistic[a]	df1	df2	Sig.
Welch	8.308	2	36.502	.001
Brown-Forsythe	6.563	2	51.024	.003

a. Asymptotically F distributed.

In the previous tables for One Way ANOVA comparison between each game in terms of an overall sum of averages of each component for all participants, we can notice that there is a difference between flow components of each game and based on the participants responses to the questionnaires and after analyzing the picked sample data, the game that had better performance for the majority of the participants was Asphalt9 (game 3) followed by Vertigo (game 2) and German Road Racer (game 1) knowing that there was no significant difference between game 2 and game 1.

Within-Subjects Factors

Measure: MEASURE_1

flow	Dependent Variable
1	MAA
2	CG
3	CO
4	UF
5	CS
6	TT
7	CN
8	SC
9	AE
10	Sum

Descriptive Statistics

	Mean	Std. Deviation	N
MAA	3.5389	1.00861	60
CG	3.6444	1.06098	60
CO	3.6208	.94610	60
UF	3.6167	1.02662	60
CS	3.4833	.92552	60
TT	3.1722	.91748	60
CN	3.6167	1.07106	60
SC	3.7222	1.13855	60
AE	3.4889	1.12574	60
Sum	31.9042	6.90305	60

Multivariate Tests[c]

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power[a]
flow	Pillai's Trace	.962	141.701[b]	9.000	51.000	.000	.962	1275.309	1.000
	Wilks' Lambda	.038	141.701[b]	9.000	51.000	.000	.962	1275.309	1.000
	Hotelling's Trace	25.006	141.701[b]	9.000	51.000	.000	.962	1275.309	1.000
	Roy's Largest Root	25.006	141.701[b]	9.000	51.000	.000	.962	1275.309	1.000

a. Computed using alpha = .05

b. Exact statistic

c.
Design: Intercept
Within Subjects Design: flow

Above tables are representation of the overall comparison via Repeated Measures ANOVA confirming that there's significance in performance for the total sum of averages of each flow component for each game.

Correlations

Nonparametric Correlations:

Nonparametric Correlations

Correlations

			TotalSum	Downloads	Ratings
Spearman's rho	TotalSum	Correlation Coefficient	1.000	.500	-.500
		Sig. (2-tailed)	.	.667	.667
		N	3	3	3
	Downloads	Correlation Coefficient	.500	1.000	.500
		Sig. (2-tailed)	.667	.	.667
		N	3	3	3
	Ratings	Correlation Coefficient	-.500	.500	1.000
		Sig. (2-tailed)	.667	.667	.
		N	3	3	3

This table represents the nonparametric correlations (Spearman) between the flow components represented by TotalSum (dependent variable) which is the summation of the overall Average table calculated before for each game and each of downloads and ratings (independent variables) retrieved from Android Play Store.

Important Note: **The submitted google drive folder contains the spss datasets, analysis outputs and a spreadsheet of the collected responses for 20 participants who played the 3 games and filled the questionnaires, for each part(game) in the spreadsheet, the first 4 participants are the team members and the averages calculated for each component per participant are the ones used later in the statistical analysis**.