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Section C

Research methods

Answer all questions in this section

1.1 A researcher wanted to investigate the types of play parents engaged in with their children.

Ten children and one parent of each child took part in the study. The researcher asked each parent to keep a diary for a month about the types of play their child engaged in.

Is the diary primary or secondary data? Justify your answer. [2 marks]

Ans. This is <u>primary</u> data. The researcher asked the parents to maintain a diary so that they could investigate the types of play they engaged in with their children.

1.2 Explain how the researcher could have used content analysis to analyse the parents' diaries. [4 marks]

Ans. The researcher will first <u>identify key themes</u> in the diary data e.g. types of play engaged in by parents with children such as 'pretend play,' 'educational play,' etc. Then, the researcher will <u>code</u> the data systematically by connecting examples of data to key themes e.g. an entry like, "I was acting as a patient and my daughter acted as if she were my doctor," would be categorised as 'pretend play,' etc. Next, the researcher would <u>tally</u> count the number of instances falling under each theme e.g. it may be found that 'pretend play' is the most recurring theme. Finally, <u>qualitative insights</u> could be provided into the data by giving some examples of e.g. how parents and children communicate during their interactive play, etc.

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1.3 The researcher was concerned about the reliability of the content analysis.

How might the researcher have assessed the reliability of the content analysis in this study? [4 marks]

Ans. The researchers will first prepare a <u>standardised coding system</u> e.g. any instance of play suggesting the parent and child enacting different roles would be categorised as 'role play'. Next <u>two researchers</u> will <u>independently code</u> the same diary data using this coding system. Next, they will <u>cross-validate their coding</u> against each other's to check for similarities of frequencies noted for each type of play. Finally, they will calculate a correlation coefficient for the frequencies obtained by each researcher and if it turns out to be <u>+0.80 or greater</u>, it will be considered that the analysis has high <u>inter-rater reliability</u>.

1.4 The researcher decided to interview some of the parents about their child's play. Explain why the data collected from the interview might have improved upon the data collected from the diaries. [3 marks]

Ans. An interview will enable researchers to gather <u>more depth</u> about types of play by asking follow-up questions to get more context which would not be possible with diary extracts. Secondly, if there is <u>ambiguity</u> in being able to classify any instance of play into a particular category, it can be resolved by probing further during the interview, again probing is not possible with an already recorded diary. Finally, interviews can encourage parents to provide more details about how they play with their children due to <u>real-time interaction with the interviewer</u> which would not be available in one-sided communication with a diary.

1.5 In the interview the researcher collected some qualitative data.

Write one question that could be used in the researcher's interview that would produce qualitative data. [2 marks]

Ans. "Can you describe a particular moment during playtime with your child that stand out to you and please explain why it is meaningful?"

1.6 Identify one limitation of qualitative data [1] Ans. One limitation is <u>possible subjectivity</u> in interpretation.

The researcher noticed age-related differences in the types of play mentioned in the diary entries. They designed an experiment to investigate the differences in play choices between 2-year-old and 4-year-old children,.

The researcher carried out the study using children from two local nursery schools. There were 30 children of each age group at nursery A. There were 20 children of each age group at nursery B. All parents gave informed consent for their children to take part in the study. The researcher used stratified sampling of the nurseries. Ten 2-year-olds and ten 4-year-olds took part in the study,

Each child was observed for 15 minutes during playtime in an area of the nursery where they could choose to play with building blocks, a sandpit and a slide. The researcher recorded how long each child spent playing with each activity.

1.7 Explain how the researcher could have obtained informed consent from the parents for this study [4 marks]

Ans. The researchers would first provide a <u>detailed consent form</u> to the parents including purpose of the study, that is differences in play choices between age groups, what participation involves such as 15-minute of observation of child's playtime in the nursery, etc. Then, they would ensure that the parents <u>understand the information</u> by asking them a few questions. Parents will be required to <u>sign the form on paper</u> - the nurseries will mail the papers to them and submit their returns to the researchers. Finally, it will be <u>reiterated to the parents</u> by the nursery staff that they can withdraw their child at any time even after giving consent.

1.8 Identify the type of experiment used in this study. Justify your answer. [3 marks]

Ans. It is a <u>guasi-experiment</u>. <u>Pre-existing groups</u> of 2-year old and 4-year old children are compared, without any manipulation of the independent variable of age. <u>Randomisation is also not possible</u>, given that these age groups are fixed.

1.9 Explain how a pilot study could be carried out to improve this study. [4 marks]

Ans. A pilot study could help check the <u>coding categories</u> for any overlap. For example, something like 'sandpit play' could overlap with 'building with wet sand'. The researcher might observe this in the pilot study and thereby operationalise 'sandpit play' as strictly 'playing with dry sand.' A pilot study could also help with <u>checking the duration</u> of observation. For example, the researcher could check whether a 15- minute session would be sufficient to observe children's play.

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There were 30 4-year-old children at nursery A and 20 4-year-old children at nursery B. The researcher used a stratified sample of 10 4-year-old children for the study.

2.0 Explain how the researcher might have obtained the stratified sample of 4-year-old children from the two different nursery schools [4 marks]

Ans. The researcher first identifies the subgroups - nursery A made up of 30 children and nursery B made up of 20 children. Next, they would calculate the proportion of children who need to be selected. The population comprises of 50 children, out of which 30 are from nursery A : 30/50 = 0.6; and 20 are from nursery B : 20/50 = 0.4. For a sample of 10, the researcher would need to select 0.6X10 = 6 children from nursery A; and 0.4X10 = 4 children from nursery B. Then the researcher will use a lottery method such as drawing chits from a bowl comprising of all names of children from nurseries A and B respectively to finalise on 6 and 4 children respectively.

The researcher calculated averages for the time (in minutes) spent in the sandpit for each age group. The results are shown in the table below.

Table 1	- Average time	e in minutes	spent in	the sandpit	for the	two age	groups
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Measure of central tendency	2-year-olds	4-year-olds	
Mean	11	6	
Median	12	6	
Mode	15	6	

2.1 Identify the type of distribution shown in the data in Table 1 for each age group. In each case justify your answer. [4 marks]

Ans.

2-year-olds: The distribution for 2-year-olds is negatively skewed. This is because the mean (11) is lesser than the median (12) which is lesser than the mode (15). This indicates amongst 2 year-olds, some children spend much less time in the sandpit.

4-year-olds: The distribution for 4-year-olds is normally distributed. This is because the mean (6), median (6) and mode (6) are exactly identical. This indicates that most 4 year-olds spend an average amount of time in the sandpit.

2.2 What do the mean values in Table 1 suggest about play preferences in 2-year-old and 4-year-old children? Justify your answer. [2 marks]

Ans. The 2 year-olds have higher play preference for the sandpit than the 4-year olds. This is indicated by the higher mean time (11 minutes) spent by 2 year-olds in the sandpit than the mean time (6 minutes) of the 4 year-olds. (This can reflect 2 year-olds greater tendency for sensory exploration at play and the tendency for 4 year olds to engage in complex, social interaction at play.)

The researcher decided to use an unrelated t-test to analyse the raw data from the study on sandpit play.

2.3 Explain three reasons for this choice in the context of this study. [6 marks]

Ans. One reason is that an <u>independent groups design</u> has been used. An unrelated t-test helps compare between separate groups such as the 2 year-olds' group and the 4 year-olds' group in this case. Another reason is that <u>continuous data</u> is collected. The time spent in minutes by the children in the sandpit has been calculated and therefore, this t-test is appropriate. Finally, <u>means</u> are being investigated for statistical significance of difference. That is, the average time spent by each group in sandpit play is being compared.

The calculated value of t was 3.576

For this study degrees of freedom (df) = 18

Level of significance for a two-tailed test	0.10	0.05	0.01	0.001
df = 17	1.740	2.110	2.898	3.965
18	1.734	2.101	2.878	3.922
19	1.729	2.093	2.861	3.883
20	1.725	2.086	2.845	3.850

Table 2 Extract from table of critical values of t

The calculated value of t must be equal to or greater than the critical value in this table for significance to be shown.

2.4 With reference to the critical values in Table 2 above, explain whether or not there was a significant difference between the two age groups at the 5% level of significance. [2 marks]

Ans. <u>Yes</u>, there is a significant difference between the 2 year-olds and 4-year-olds with respect to time spent at the sandpit at the 5% level of significance. This is because the calculated t-value of 3.576 is <u>greater than</u> the critical value 2.101 at the 5% level for 18 df.

2.5 Referring to the critical values in Table 2, explain why the researcher is very unlikely to have made a Type I error [3 marks]

Ans. A type I error in this case would mean stating that there is a significant difference in the time spent playing in the sandpit by 2 year-olds and 4 year-olds even though there is no such difference in the population of children. The researcher is very unlikely to have committed this error as the obtained t-value is significant even at the <u>stringent alpha level of 0.01</u>. That is, the calculated value of 3.576 is <u>greater than</u> the 0.01 level critical t-value of 2.878 for 18 df.

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