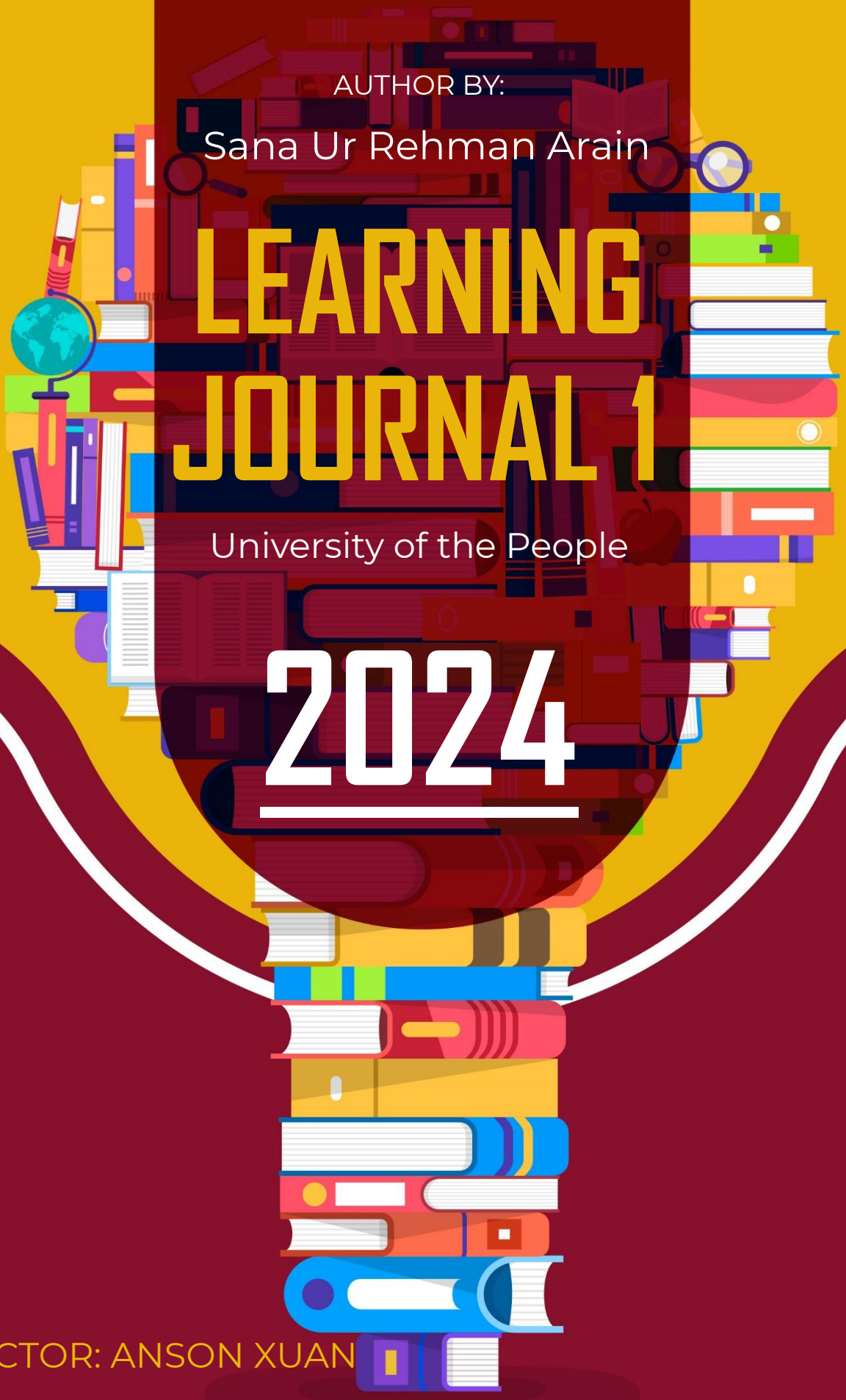

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LEARNING JOURNAL 1

University of the People

2024

INSTRUCTOR: ANSON XUAN

MATH 1281-01 Statistical Inference – AY2025-T3

PART I

a) **Defining the Population:**

The population in this survey consists of all **families in the Dominican Republic**. This represents the entire group we're trying to learn about through our sample.

b) **Population Parameter:**

The population parameter estimated in this survey is the **proportion of families in the Dominican Republic that cannot afford a $300** unexpected expense without tapping into loans.

c) **Point Estimate:**

The point estimate for this parameter is the proportion of families in the sample that reported they couldn't afford the expense without taking loans. This is calculated as:

p^ = Number of families that cannot afford the expense / Total number of families in the sample

p^ = 232 / 675 ≈ 0.3437

So, the point estimate is approximately **0.3437, or 34.37%.**

d) **Statistics to Measure Uncertainty:**

The statistic used to measure the uncertainty of the point estimate is the standard error (SE) of the sample proportion. It's calculated as:

$$SE = \sqrt{\frac{p(1-p)}{n}}$$

SE = $\sqrt{.3437} * (1 - .3437 \div 675 =$ **0.0183**

e) Recomputing with True Population Value:

If the true population value is found to be 40% (P = 0.4), we would recompute the standard error using this value:

SE = $\sqrt{.4} * (1 - .4) \div 675 \approx$ $\mathbf{0.0189}$

The difference is small (1.83% vs 1.89%) because both proportions are relatively close to each other, and the sample size is large.

PART II

Confidence Interval for the Fraction of Viewers:

To construct a 95% confidence interval for the fraction of viewers who made a visit because of a coupon, we'll use the formula for the confidence interval of a proportion:

$\hat{p} \pm Z \times SE$

$\hat{p} = 124 / 504 \approx .246$

$SE = \sqrt{(\hat{p}(1 - \hat{p}) / n)}$

$SE = \sqrt{.246 * (1 - .246) / 504} \approx 0.019185$

Then, we construct the confidence interval:

$0.246 \pm 1.96 \times 0.019185$

This results in:

0.246 ± 0.0386

So, the 95% confidence interval is approximately:

[0.2084, 0.2836]

This means that we are 95% confident that the true fraction of all viewers who made a visit because of a coupon lies between 20.84% and 28.36%.
