National University - Manila

COLLEGE OF COMPUTING AND INFORMATION TECHNOLOGIES

ANALYSIS OF PERSONAL SPENDING BEHAVIOR THROUGH GCASH EXPENSE TRANSACTIONS

Data Science

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BACKGROUND

- Digital wallets enable fast and cashless transactions.
- GCash is widely used in daily payments in the Philippines.
- Convenience may reduce awareness of spending.
- Studying transaction data helps improve financial decisions.

GENERAL OBJECTIVE

To analyze one year of personal GCash expenses to identify spending patterns and behavioral trends.

Specific Objectives:

- Categorize expense transactions.
- Identify highest spending categories.
- Measure transaction frequency.
- Analyze monthly spending trends.
- Summarlize expense behavior.
- Apply statistical analysis.

RESEARCH QUESTIONS

- **RQ1**: Which categories account for the highest personal expenses?
- **RQ2**: How frequently do expense transactions occur within each category?
- **RQ3**: How do personal expenses change over time?
- **RQ4**: What patterns can be observed in overall spending behavior?
- **RQ5**: Are there significant differences or relationships in spending behavior across categories and time periods?

METHODOLOGY

DATA SOURCE

- Dataset: 1 year of personal GCash transactions.
- Participant: researcher (n = 1).
- Data anonymized for privacy (mobile numbers).
  - personal number → 'My_Number'
  - other's number → 'Others_Number'

DATA VARIABLES

- Date & Time - timestamp of the transaction
- Description - transaction details
- Transaction ID - unique identifier
- Debit (expense) - amount deducted from the account
- Credit (income) - amount added to the account
- Balance - account balance after the transaction

DATA CLEANING & PREPARATION

- Converted dates & numeric values.
- Replaced missing values.
- Removed duplicates.
- Sorted chronologically.
- Filtered **expense** transactions.

METHODOLOGY

FEATURE ENGINEERING

Transactions categorized using keywords:

Category	Representative Keywords
apple_services_payment	apple services
spotify_subscription_payment	spotify
online_shopping_payment	shopee, lazada, tiktok
food_delivery_payment	grab, foodpanda
game_payment	mlbb, steam, genshin, xsolla, honkai
buy_load	load, gigalife
bdo_to_gcash_transfer	bdo
outgoing_transfer	from [mobile number]
incoming_transfer	to [mobile number], starting balance
school_fee_payment	National University, Bancnet P2M

DATA ANALYSIS TECHNIQUES

Exploratory Data Analysis

- Descriptive statistics
- Category analysis
- Time-series trends

Statistical Tests

- t-test (weekday vs weekend)
- ANOVA (category differences)
- Correlation analysis

HYPOTHESES

	H_0 (Null Hypotesis):	H_1 (Alternative Hypothesis):
Weekday vs Weekend Spending (t-test)	There is no significant difference between weekday and weekend expense amounts.	There is a significant difference between weekday and weekend expense amounts.
Differences Across Spending Categories (ANOVA)	There is no significant difference in mean expense amounts across spending categories.	At least one category differs significantly in mean expense amount.

Significance Level: $\alpha = 0.05$

RESULTS

Dataset Overview:

	count	unique	top	freq	mean	min	25%	50%	75%	max	std
Date and Time	174	-	-	-	2025-08-27 12:34:58.965517056	2025-02-02 15:59:00	2025-05-25 02:44:00	2025-09-17 04:24:00	2025-12-20 12:01:45	2026-02-02 09:16:00	-
Description	174	50	Transfer from My_Number to Others_Number	46	-	-	-	-	-	-	-
Debit	174	-	-	-	925.948621	10.64	86	161.235	491.04	26523.6	3157.338938
Category	174	8	game_payment	48	-	-	-	-	-	-	-

A total of **174 expense transactions** were recorded during the study period. The dataset spans from **February 2, 2025 to February 2, 2026**, representing one full year of personal digital wallet spending activity.

RESULTS

Annual Expenses per Category Summary

Category	Total Amount (PHP)
school_fee_payment	70,152.00
outgoing_transfer	55,857.00
game_payment	12,030.79
online_shopping_payment	7,587.02
apple_services_payment	7,532.00
buy_load	3,519.00
food_delivery_payment	3,413.25
spotify_subscription_payment	1,024.00

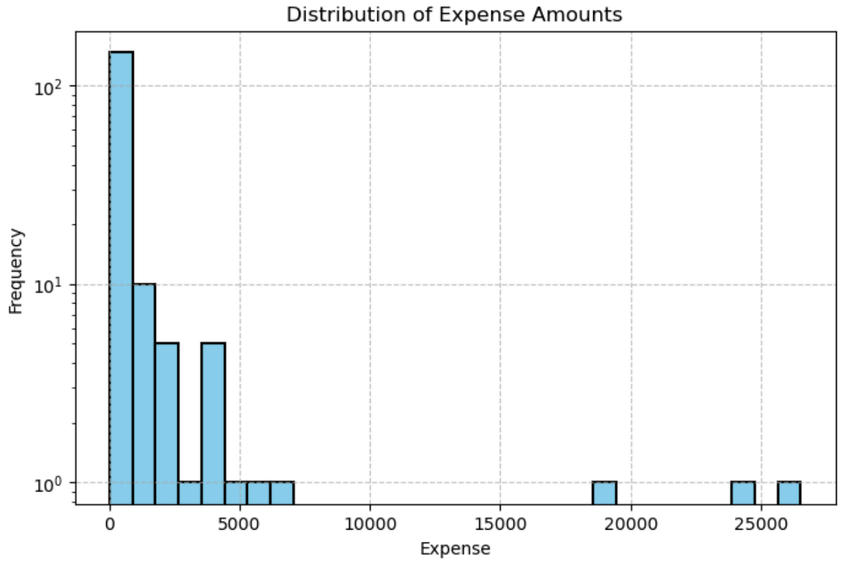
School fee payments accounted for the highest total expenses, amounting to PHP 70,152.00, followed by **outgoing transfers** totaling PHP 55,857.00.

RESULTS

Descriptive Statistics of Expense Transactions

Statistic	Value (PHP)
Number of Transactions	174
Minimum Expense	10.64
Maximum Expense	26,523.60
Mean Expense	925.95
Median Expense	161.24
Standard Deviation	3,157.34

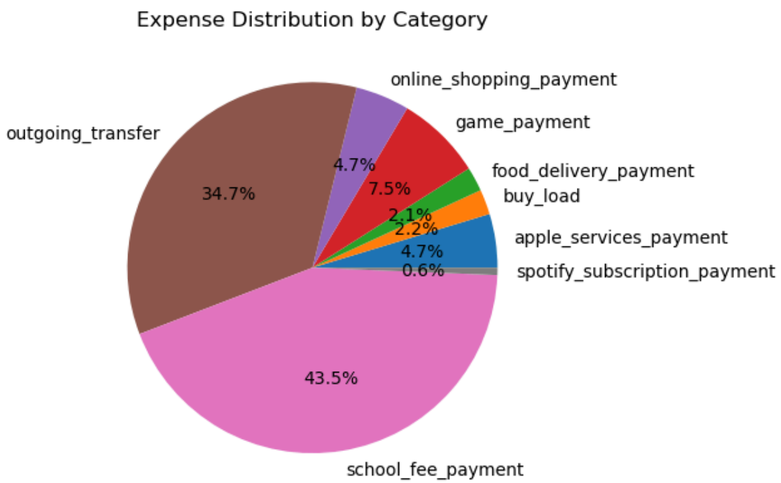
Expense Distribution



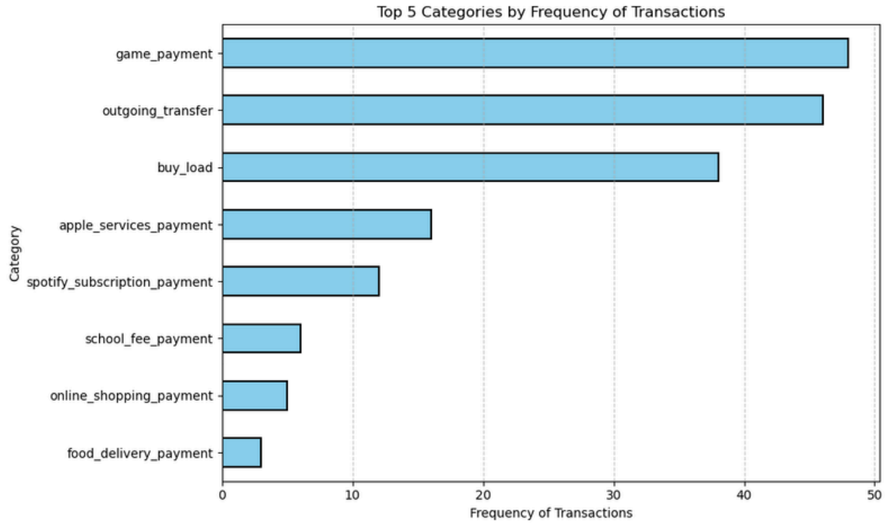
Most transactions were **small or medium-sized** expenses (< PHP500.00)

RESULTS

Expense Distribution by Category



Spending by Category (Ranked)



Transaction Frequency and Total Spending per Category:
r = 0.105 (weak positive relationship)

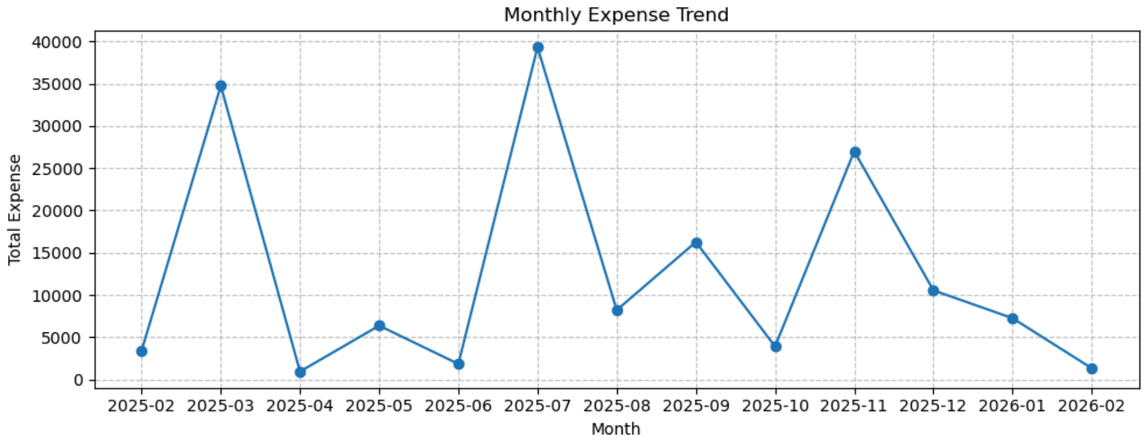
Categories with more transactions do not necessarily correspond to higher total spending.

RESULTS

(Top 5) Highest Expense Transactions

Year-Month	Category	Amount (PHP)
2025-03	school_fee_payment	26,523.60
2025-07	school_fee_payment	24,039.60
2025-11	school_fee_payment	18,763.80
2025-07	outgoing_transfer	7,000.00
2025-08	outgoing_transfer	5,700.00

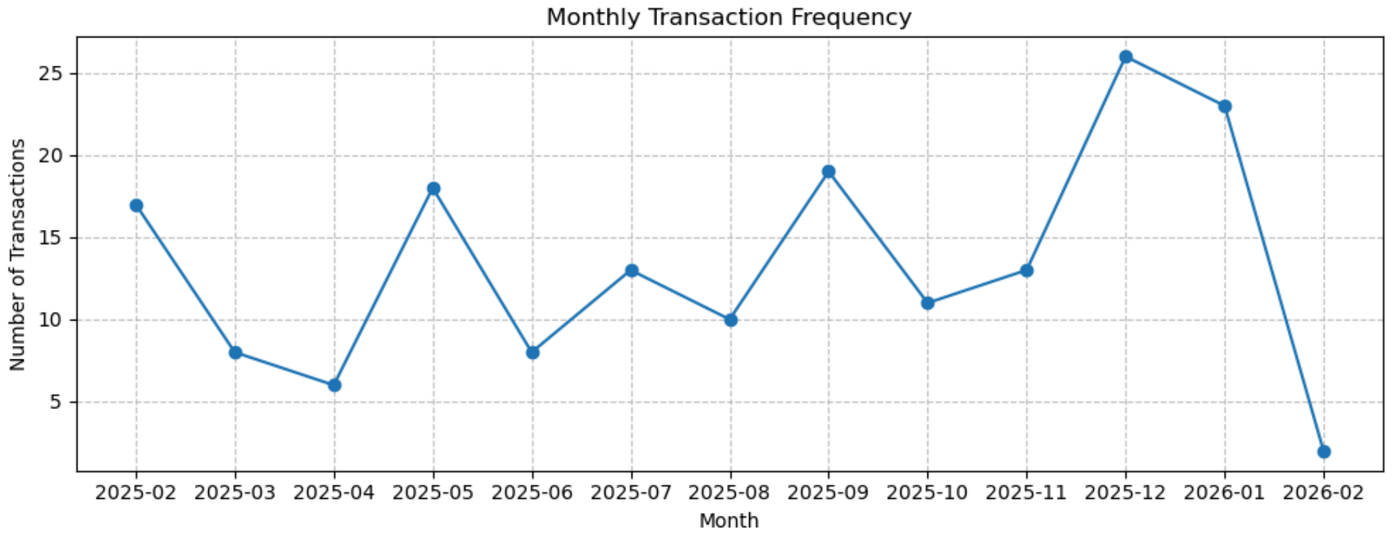
Monthly Expense Trend



Expense peaks may associated with the **academic calendar.**

RESULTS

Monthly Transaction Frequency



Transaction frequency peaked in **December 2025**, indicating increased spending activity during this period.

RESULTS

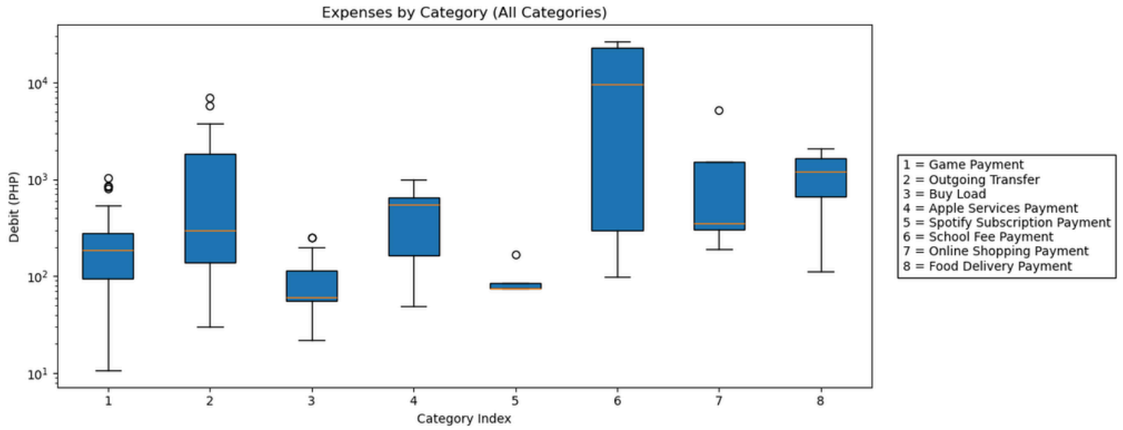
Weekday vs Weekend Spending

	T-statistic	p-value	H_0 (Null Hypotesis):	H_1 (Alternative Hypothesis):
Weekday vs Weekend Spending (t-test)	**1.92**	**0.0567**	There is no significant difference between weekday and weekend expense amounts.	There is a significant difference between weekday and weekend expense amounts.

The null hypothesis cannot be rejected, indicating **there is no statistically significant difference between weekday and weekend spending.**

RESULTS

Differences in Spending Across Categories

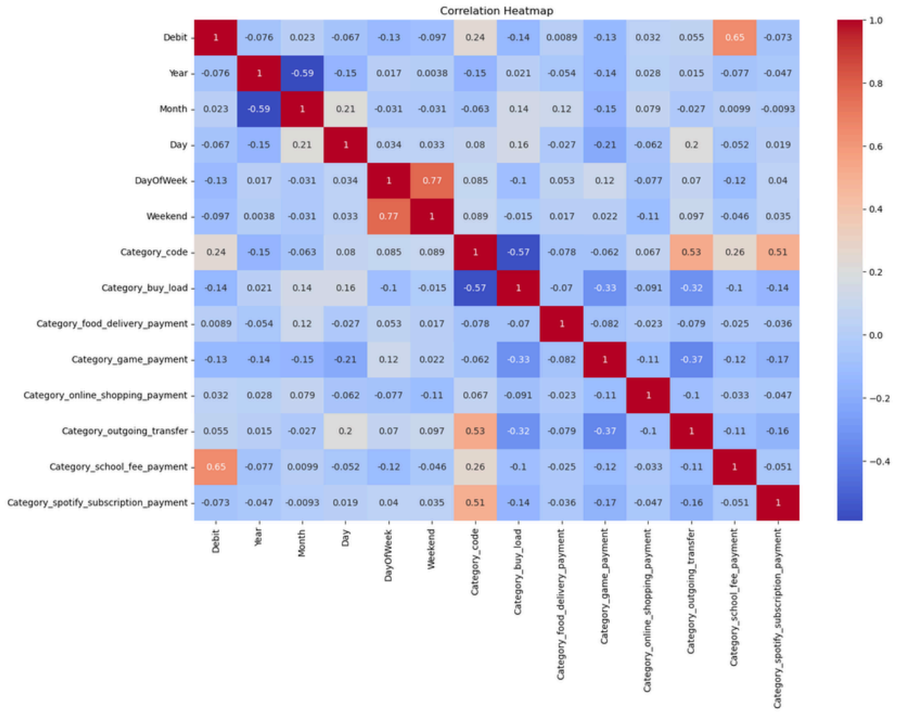


	F-statistic	p-value	H_0 (Null Hypotesis):	H_1 (Alternative Hypothesis):
Differences Across Spending Categories (ANOVA)	**18.74**	**< 0.001**	There is no significant difference in mean expense amounts across spending categories.	At least one category differs significantly in mean expense amount.

The null hypothesis is rejected, indicating **significant differences exist in expense amounts across categories**

RESULTS

Correlation Analysis



Only one variable has a **strong positive correlation (r = 0.65)** which was observed between **school fee payments and expense amounts**, indicating that large expenses are strongly associated with this category.

DISCUSSION

Discussion Overview

- This study analyzed one year of GCash expense transactions.
- Findings reveal patterns in spending categories, frequency, and trends.
- Results highlight behavioral patterns and financial awareness insights.

DISCUSSION

RQ1: Which Categories Have the Highest Expenses?

- School fees accounted for the largest expenses.
- Outgoing transfers ranked second.
- High-value obligations dominated total spending.

Key Insight:

- Major financial responsibilities shape total expenses.

DISCUSSION

RQ2: How Frequent Are Expense Transactions?

- Game payments were the most frequent.
- Buy load and transfers occurred regularly.
- Frequent transactions did not equal highest spending.

Key Insight:

- Routine habits differ from major financial obligations.

DISCUSSION

RQ3: How Do Expenses Change Over Time?

- Spending fluctuated monthly.
- Highest spending occurred in July 2025.
- Peaks corresponded to large payments.
- Lower months had fewer major obligations.

Key Insight:

- Monthly spending is driven by major financial events.

DISCUSSION

RQ4: What Patterns Exist in Spending Behavior?

- Most transactions were small to medium.
- A few large expenses increased the average.
- Spending distribution is right-skewed.
- Transaction activity increased in December–January.

Key Insight:

- Frequent small expenses + occasional large payments shape spending behavior.

DISCUSSION

RQ5: Are There Significant Differences or Relationships?

- Weekday vs Weekend
  - No significant difference ($p > 0.05$)
  - No spending pattern across the week
- ANOVA (Categories)
  - Significant differences exist between categories
  - School fees had highest expense levels
- Correlation
  - Weak relationship between frequency and spending
  - Large expenses drive totals, not frequency

DISCUSSION

Key Insights from the Findings

- Frequent small expenses accumulate over time.
- Large obligations dominate total spending.
- Spending patterns vary by category and time.
- Digital wallets reveal behavioral trends.

DISCUSSION

Implications for Personal Finance

- Expense tracking improves financial awareness.
- Monitoring categories supports better budgeting.
- Digital wallets enable behavior-based financial decisions.

DISCUSSION

Limitations

- Single participant study.
- Only GCash transactions analyzed.
- Cash and other platforms excluded.
- Keyword classification may introduce errors.

DISCUSSION

Recommendations for Future Work

- Include multiple participants.
- Integrate multiple financial platforms.
- Develop predictive expense models.
- Explore long-term financial behavior trends.

THANK YOU ^^