A Mixed-Methods Study on Google Classroom Use: Thematic Perspectives and Quantitative Insights on Student Engagement and Connectivity at the City of Malabon University

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Abstract: This study examines the experiences, engagement, and connectivity challenges of third-year Information Technology students at the City of Malabon University (CMU) in using Google Classroom as a learning management system (LMS). A mixed-methods design was employed, triangulating quantitative survey data with qualitative thematic analysis of open-ended responses from 222 students. Findings revealed that ease of use, accessibility, and assignment management were consistent strengths across both data streams, while unstable internet connectivity and limited instructor responsiveness remained persistent barriers to student learning. Engagement was positively influenced by the platform's user-friendly design and structured task management, though often undermined by delays in instructor feedback. Students demonstrated adaptability through strategies such as mobile data use, downloading materials in advance, and flexible scheduling. The study recommends institutional support for connectivity, structured faculty training, and student orientation to enhance platform effectiveness. By integrating thematic and quantitative findings, this research strengthens evidence on digital equity and resilience in higher education, offering practical insights for resource-constrained universities in the Philippines and similar contexts.

1 INTRODUCTION

The landscape of higher education continues to evolve with the integration of digital technologies. Among these, learning management platforms have become indispensable in supporting instruction, communication, and enabling collaboration between educators and students. Google Workspace for Education, particularly Google Classroom, offers a streamlined and accessible way to manage coursework and learner engagement.

International research has consistently highlighted its acceptance and effectiveness [1]. It reports high student acceptance of Google Classroom due to its user-friendly interface, while paper [2] emphasizes teachers' positive perceptions of its utility in task management and instructional support. In the Philippine context, a study confirms the platform's usability, but notes constraints caused by internet connectivity [3]. Similarly, paper [4] underscores its role during the "new normal," identifying gaps in faculty training and connectivity, while paper [5] examines opportunities and challenges for broader integration.

At the City of Malabon University (CMU), the adoption of such technologies is vital. As a local government-funded institution, CMU faces financial constraints that limit its ability to acquire proprietary learning management systems. Institutional access to Google Workspace for Education provides an opportunity to implement Google Classroom at no cost. This is particularly important given recent environmental disruptions, including flooding caused by tide gate damage and extreme heat reaching up to 46°C [6], [7], which have repeatedly forced class suspensions. These conditions highlight the urgency of robust and resilient digital learning systems.

This study investigates the implementation of Google Classroom across eight sections of third-year Information Technology (IT) students at CMU. It focuses on students' experiences, levels of

engagement, and challenges, particularly those related to internet connectivity, through a mixed-methods approach combining thematic analysis and quantitative evaluation. The findings aim to generate evidence-based recommendations to guide institutional strategies for optimizing Google Classroom's adoption.

1.1 Statement of the Problem

Despite the availability of Google Classroom at the City of Malabon University (CMU), the extent of its utilization by faculty and its effectiveness from the students' perspective remains uncertain. There is limited understanding of:

1) How students perceive the platform's usability and effectiveness in supporting their learning.
2) The degree to which Google Classroom influences student engagement and interaction.
3) The challenges, particularly related to internet connectivity, that hinder effective use of the platform.
4) The strategies students employ to address these challenges.
5) Given these gaps, it is important to evaluate student experiences systematically and provide evidence-based recommendations to guide faculty and institutional practices in maximizing Google Classroom's potential.

1.2 Objectives of the Study

1.2.1 General Objective

To assess the experiences, perceptions, engagement levels, and challenges of third-year Information Technology students in using Google Classroom at CMU through both quantitative and qualitative evaluation.

1.2.2 Specific Objectives

- To evaluate students' perceptions of the usability and effectiveness of Google Classroom as an instructional tool.
- To analyze the level of student engagement and interaction facilitated by the platform using both quantitative data and thematic insights.
- To identify and understand the challenges that affect the effective use of Google Classroom.
- To conduct a thematic evaluation of student feedback to extract key themes related to experience, engagement, and barriers.
- To formulate evidence-based recommendations for CMU faculty to enhance the integration and pedagogical use of Google Classroom within the university's existing resource constraints.

1.3 Significance of the Study

This study advances the digital learning environment at the City of Malabon University (CMU) by examining the experiences, engagement levels, and connectivity challenges of third-year Information Technology students in their use of Google Classroom. Its timeliness is underscored by repeated class suspensions in Malabon due to flooding and extreme heat [8], [9], highlighting the need for resilient and flexible learning modalities. Google Classroom emerges as a vital tool for sustaining instructional delivery under such disruptions [3], [4].

A strength of this research lies in its mixed-methods design, which integrates quantitative evaluation with qualitative thematic analysis following Braun and Clarke's framework [5]. This dual approach provides both statistical trends and rich, contextual insights, offering a comprehensive understanding of student experiences.

2 METHODOLOGIES

This study employed a mixed-methods design to capture a comprehensive view of third-year IT students' experiences with Google Classroom at CMU. By integrating quantitative and qualitative approaches, the design enabled triangulation that enhanced the validity and depth of findings [10], [11].

The quantitative component utilized survey questionnaires to measure perceptions, engagement levels, and connectivity challenges. The qualitative component gathered open-ended responses, providing personal reflections and contextual insights into usability, effectiveness, and barriers [12], [6]. Together, these methods balanced statistical patterns with rich thematic evidence.

2.1 Population and Sampling

The study focused on third-year Information Technology (IT) students at CMU who actively used Google Classroom across eight (8) sections under the researcher's supervision. A purposive sampling

technique was employed to ensure participants had direct and relevant experience with the platform. A total of 222 students participated in both the quantitative survey and qualitative open-ended responses, providing sufficient breadth and depth to support the mixed-methods design.

2.2 Data Collection Instruments

A single integrated Google Form was used to gather both quantitative and qualitative data. The instrument consisted of two parts: (1) a structured 5-point Likert scale survey to measure perceptions, engagement, and connectivity challenges, and (2) open-ended questions that elicited personal experiences, difficulties, and suggestions for improvement.

2.3 Data Collection Procedure

Participation was voluntary, with respondents informed of their rights and the option to withdraw at any time. The Google Form was distributed via institutional email, and students were encouraged to complete both the survey and open-ended sections within the same form. This design ensured efficient administration while allowing students to reflect on their experiences in their own words.

2.4 Data Analysis

A structured, engineering-inspired workflow was implemented to ensure rigor, reproducibility, and systematic derivation of findings. Two analytical streams – quantitative and qualitative – were executed in parallel, then integrated through a mixed-methods triangulation framework.

2.4.1 Quantitative Analysis

Survey responses were cleaned and processed using descriptive statistical algorithms (frequency, percentages, mean scores). Data visualization tools generated bar charts, treating the dataset as a whole, where preprocessing, computation, and visualization followed.

2.4.2 Qualitative Analysis

Open-ended responses were processed using Braun and Clarke's six-phase thematic analysis [6]. Inputs were preprocessed to remove noise, coded systematically, and transformed into thematic clusters. This process is a workflow where raw input is refined into structured, interpretable outputs.

2.4.3 Integration and Triangulation

The two streams were fused using an approach analogous to multimodal data integration in engineering systems. Quantitative metrics were validated against qualitative themes (e.g., connectivity challenges) to enhance reliability and provide cross-verified conclusions.

This hybrid approach demonstrates how algorithmic statistical computation and systematic text analysis guided by engineering principles of rigor, repeatability, and validation can be combined to produce robust, technically sound results.

3 RESULT AND DISCUSSION

3.1 Thematic Analysis Result

3.1.1 Question 1: "Can you Describe your Overall Experience with using Google Classroom in your Courses?"

The responses from 222 students indicate a generally positive experience with Google Classroom, highlighting usability, organization, and accessibility as key strengths. Most students described the platform as user-friendly, frequently using terms such as helpful, efficient, and convenient (Table 1). It was particularly effective in asynchronous and blended learning contexts.

Table 1: Thematic analysis results for Question 1.

Theme	Frequency
Overall Satisfaction	80
Ease of Use	54
Organization and Tracking	31
Connectivity Challenges	21
Other/Uncategorized	47

Nevertheless, connectivity issues were a recurring challenge, limiting students' ability to access or submit tasks. A smaller but notable group also cited limited instructor communication as an area for improvement.

3.1.2 Question 2: "What Features of Google Classroom Do You Find Most Beneficial for your Learning?"

The most frequently mentioned benefit was the platform's assignment submission system, including its submission buttons, timers, and structured

deadlines and accessibility, with students appreciating the ability to access Google Classroom anytime and anywhere. Another important theme was communication tools within the platform. Students found the ability to leave class comments, send private messages to instructors, and receive direct feedback highly beneficial. The platform's notification and deadline reminders were also appreciated. Lastly, a significant number of responses fell under uncategorized feedback (Table 2).

Table 2: Thematic analysis results for Question 2.

Theme	Frequency
Accessibility	41
Assignment Submission	52
Communication Tools	27
Notifications and Deadlines	8
Other/Uncategorized	84

3.1.3 Question 3: "Have you Encountered Any Challenges while Using Google Classroom? Please Elaborate."

The findings reveal that challenges were primarily linked to internet access and task submission. The most frequently cited issue was unstable Wi-Fi or insufficient mobile data, reported by 80 students. A second major theme was late submission and missed deadlines, often attributed to overlooked notifications, system delays, or connectivity interruptions. A smaller group also noted limited communication or delayed feedback from instructors (Table 3).

Table 3: Thematic analysis results for Question 3.

Theme	Frequency
Internet and Connectivity Issues	80
Late Submission and Deadlines	22
Lack of Communication or Feedback	10
Limited Device Access	3
Other/Uncategorized	50

3.1.4 Question 4: "What Strategies have you Employed to Overcome Connectivity Challenges when Accessing Google Classroom?"

Students reported several strategies to overcome connectivity issues. The most common, cited by 81 respondents, was relying on mobile data or prepaid load. Others downloaded materials in advance during stable internet periods, allowing offline study. Some changed location to access better signals, while others scheduled tasks during low-traffic hours (Table 4). These strategies demonstrate student adaptability and resourcefulness in sustaining learning despite connectivity challenges.

Table 4: Thematic analysis results for Question 4.

Theme	Frequency
Using Mobile Data or Load	81
Downloading Materials in Advance	26
Changing Location for Better Signal	21
Time Management or Scheduling Access	17
Other/Uncategorized	59

3.1.5 Question 5: "In Your Opinion, how can the Use of Google Classroom be Improved to Better Support Students' Learning Experiences?"

Students expressed interest in making Google Classroom more interactive, communicative, and adaptive. While most were satisfied with its core functions, they highlighted several areas for improvement. The most frequent suggestion was the addition of interactive features such as real-time discussions, collaborative boards, quizzes, or gamified elements to simulate dynamic learning environments. Communication tools were another priority, with students requesting private chat options, faster instructor feedback, and clearer channels for interaction (Table 5). A smaller group recommended enhanced scheduling functions, including built-in calendars and automated reminders. A large portion of responses, however, were uncategorized, consisting of general remarks or vague suggestions.

Table 5: Thematic analysis results for Question 5.

Theme	Frequency
More Interactive Features	28
Improved Communication Tools	20
Better Scheduling or Calendar Integration	8
Mobile Accessibility Improvements	6
Others/Uncategorized	116

3.1.6 Question 6: "Would you Recommend the Continued Use of Google Classroom to your Instructors? Why or why not?"

Thematic analysis showed that students most frequently recommended Google Classroom for its ease of use, describing it as simple, intuitive, and accessible to a wide range of learners. This usability fostered confidence and efficiency, while many also emphasized its value in enhancing learning,

particularly for distance and asynchronous education. Additional strengths included support for organization and task management, such as tracking deadlines, submitting assignments, and receiving announcements (Table 6). Accessibility across devices, especially mobile phones, was also appreciated. A smaller group expressed mixed or resistant views, citing integration issues or a preference for more interactive tools.

Table 6: Thematic analysis results for Question 6.

Theme	Frequency
Ease of Use	65
Improved Learning Experience	48
Organization and Task Management	22
Access and Availability	23
Other/Uncategorized	61

3.1.7 Question 7: "Do you have any additional comments or suggestions regarding the use of Google Classroom at City of Malabon University?"

A notable share of responses highlighted the need for student orientation and training, suggesting guides, tutorials, or onboarding sessions. Others emphasized instructor engagement, stressing that effective communication on the platform depends on timely updates and responsiveness. Several students praised Google Classroom's convenience, particularly during the shift to online learning, while others recommended interface improvements, enhanced notifications, or better system integration. A substantial number of comments were uncategorized, consisting of general remarks or preferences for face-to-face learning (Table 7).

Table 7: Thematic analysis results for Question 7.

Theme	Frequency
Orientation and Training	15
Instructor Engagement	11
Positive Feedback and Praise	19
Platform Improvement Suggestions	8
Other/Uncategorized	60

3.1.8 Total Thematic Summary: Google Classroom Experience at City of Malabon University

It is important to note that a substantial number of responses were coded as "Other/Uncategorized," largely reflecting neutral or non-specific feedback. This limited the granularity of insights, and future studies may refine these responses into more specific categories for deeper analysis (Table 8).

Table 8. Total thematic result.

Theme	Frequency
Ease of Use	Q1 (Experience), Q6 (Recommendation), Q5 (Suggestions)
Assignment Management and Tracking	Q2 (Features), Q6 (Recommendation), Q1
Accessibility and Flexibility	Q1, Q2, Q4 (Connectivity Strategies), Q6
Connectivity Challenges	Q3 (Challenges), Q4 (Strategies), Q1
Communication Gaps	Q3, Q5, Q7 (Comments)
Training and Orientation Needs	Q7 (Comments), Q5
Instructor Engagement	Q3, Q7
General Satisfaction and Praise	Q1, Q6, Q7

3.2 Descriptive Statistics Result

3.2.1 Demographic Information

Demographic data show that nearly all students had digital access, with smartphones being the most common device (95.9%). Almost half (47.3%) reported access to personal computers, while smaller groups used tablets (4.5%) or shared devices (5.4%). Notably, no student lacked access entirely, confirming universal but uneven device availability. In terms of connectivity, most students relied on Wi-Fi (69.8%), though a significant portion (29.7%) still depended on mobile data.

3.2.2 Perception and Experience

Student perceptions of Google Classroom were largely positive. Over 83% agreed that the platform is easy to navigate, and 83.8% affirmed that assignments and materials are readily accessible. A majority (68%) believed the platform enhanced their learning experience, though nearly a quarter remained neutral. Communication with instructors was rated less favorably, with 58.1% positive, 30.2% neutral, and 11.8% expressing dissatisfaction.

3.2.3 Engagement and Satisfaction

Overall feedback reflects strong engagement and satisfaction with Google Classroom. Nearly 60% of students reported feeling more engaged in coursework, though 31.5% remained neutral. A large majority (70.7%) stated the platform motivated

timely submission of assignments, supporting effective task management. Satisfaction levels were similarly high, with 74.3% expressing overall satisfaction and only 6.8% dissatisfied. Endorsement was strong, as 79% said they would recommend Google Classroom, underscoring its perceived value and effectiveness.

3.2.4 Connectivity Challenges

Survey results confirm that internet connectivity remains a major barrier to effective use of Google Classroom, affecting both performance and communication. Over 80% of students reported some level of difficulty, with 44.2% rating severe disruptions. Nearly half (49.1%) indicated connectivity issues hindered assignment submission, and a similar share relied heavily on mobile data despite widespread Wi-Fi availability. Connectivity challenges also caused students to miss announcements and deadlines (45.5%), underscoring its impact on both task completion and real-time engagement.

3.2.5 General Discussion of the Qualitative Analysis Results

The qualitative analysis offers a structured understanding of students' experiences with Google Classroom at CMU. Demographic data show a balanced distribution of respondents, with smartphones emerging as the dominant device, pointing to a mobile-centric trend in platform usage. This reflects the broader reliance of students on portable technologies for academic access.

Perceptions of Google Classroom were largely positive. Students emphasized its ease of use, organized layout, and effectiveness in managing tasks and submissions. Many highlighted that the platform simplified academic requirements and provided a convenient way to access materials and monitor deadlines. These findings align with earlier studies that note the platform's intuitive interface and efficiency in supporting digital learning.

Engagement and satisfaction were also reported at moderate to high levels. Students credited Google Classroom with enhancing participation, particularly by making course content accessible and structured. However, satisfaction was not uniform. A subset of students indicated challenges linked to unstable internet or delayed instructor feedback, suggesting that teacher responsiveness remains a critical factor in shaping overall satisfaction.

Connectivity challenges emerged as the most persistent barrier. Reports of slow internet, limited data availability, and unstable connections frequently disrupted access, submission of assignments, and attendance in synchronous sessions. These technical difficulties demonstrate that while Google Classroom can provide a strong foundation for digital learning, its success is highly dependent on reliable infrastructure and consistent support from instructors.

3.3 Integration of Thematic and Quantitative Results

The thematic and quantitative findings show strong convergence. Both methods highlighted ease of use, accessibility, and assignment management as major strengths, while connectivity challenges and limited instructor responsiveness consistently emerged as barriers. For example, over 80% of survey respondents agreed that Google Classroom is easy to navigate, which aligns with recurring qualitative themes of usability and organization. Similarly, connectivity issues were the top theme in open-ended responses and were reported by more than 80% of students in the survey. Instructor responsiveness appeared as both a qualitative concern and a quantitative weakness, confirming its critical role in student satisfaction. This alignment across methods strengthens the validity of the study and demonstrates that the challenges and benefits of Google Classroom at CMU are consistent across both numerical data and student narratives.

4 SUMMARY OF FINDINGS

This study aimed to evaluate the overall experience, perception, engagement, and connectivity challenges faced by 222 third-year Information Technology (IT) students at the City of Malabon University (CMU) in using Google Classroom as a learning management platform. Employing both quantitative (graphical analysis) and qualitative (open-ended responses) data, the research offered a comprehensive understanding of students' interaction with the platform, which is an approach consistent with best practices in mixed-methods research [1].

Demographic data revealed that most students accessed Google Classroom via mobile phones, with responses coming from multiple IT sections at the third-year level. This indicates a mobile-first learning context, particularly relevant in resource-constrained urban academic settings like CMU [2].

Analysis of survey responses showed strong positive sentiments regarding the platform's usability. Students consistently rated Google Classroom as organized, easy to navigate, and effective for academic task tracking, consistent with previous research emphasizing its user-friendly design [3], [4]. However, the analysis also highlighted key barriers such as intermittent internet connectivity and underscored the critical role of teacher responsiveness in enhancing student engagement and satisfaction, findings that echo broader patterns in Philippine online learning environments [5].

Thematic evaluation of open-ended responses surfaced recurring themes, including the importance of:

- Intuitive interface design.
- Well-organized content delivery.
- Platform accessibility and mobile-friendliness.

Students also proposed actionable improvements, such as:

- Enhanced internet access.
- More responsive instructors.
- Greater platform interactivity.
- Institutional training or orientation on digital tools.

These findings validate the use of thematic analysis in uncovering user perspectives that extend beyond quantitative metrics [8], and they emphasize the platform's potential to support resilient and inclusive digital learning when pedagogical and infrastructural supports are in place.

5 CONCLUSIONS

Based on the findings, the following conclusions were drawn:

1) Google Classroom is an effective platform for managing academic tasks, particularly when face-to-face classes are disrupted.
2) Students are satisfied with features such as assignment tracking and accessibility, though satisfaction depends heavily on internet quality and instructor responsiveness.
3) Connectivity challenges, such as mobile data costs, poor Wi-Fi, and unstable signals, remain the most significant barrier to platform use.
4) Instructor engagement strongly influences student motivation; delayed or limited feedback reduces the effectiveness of communication tools.
5) Students show adaptability through coping strategies such as adjusting schedules, downloading materials early, and relying on mobile data.
6) Structured training and orientation are needed for both students and faculty to maximize the benefits of Google Classroom and ensure effective use
7) Thematic and quantitative findings showed strong consistency, with both identifying ease of use and accessibility as strengths and connectivity and instructor responsiveness as persistent barriers. This triangulation reinforces the reliability of the study and offers a well-rounded view of student experiences at CMU.

This study contributes to the growing body of literature on digital learning by situating the use of Google Classroom within the unique context of a local government-funded university in the Philippines. While prior research has confirmed the platform's usability and general effectiveness, this study extends the discussion by highlighting the challenges of connectivity and environmental disruptions (e.g., flooding and extreme heat) that shape continuity of learning in Malabon. By integrating both quantitative and thematic insights, the study offers evidence-based recommendations for faculty responsiveness, student adaptability, and institutional support, providing a practical framework for enhancing LMS adoption.

6 RECOMMENDATIONS

In light of the conclusions drawn, the following recommendations are proposed:

- Institutional Support for Connectivity – Provide campus Wi-Fi access or negotiate student data packages with internet providers to reduce inequities in online learning.
- Faculty Training – Conduct regular training sessions for faculty on best practices in Google Classroom, emphasizing timely feedback and interactive teaching strategies.
- Student Orientation – Offer onboarding programs and digital guides to help students maximize Google Classroom features for task management and communication.
- Platform Enhancement – Expand Google Classroom's functionality through integration with external collaborative platforms and interactive applications (e.g., real-time co-authoring tools, digital whiteboards, gamified

learning apps) to foster engagement and active learning.

- Responsive Feedback Standards – Establish guidelines for timely instructor responses to messages and submissions to improve student motivation and satisfaction.
- Mixed-Methods Evaluation – Promote the continued use of mixed-methods research in institutional studies to ensure integration of both quantitative trends and qualitative insights, enhancing evidence-based decision-making for digital learning.
- Future Research – Extend this study to other year levels, disciplines, and faculty perspectives, using established models (e.g., TAM, UTAUT) to provide theoretical depth.

REFERENCES

[1] R.S. Al-Maroof and M. Al-Emran, "Students' Acceptance of Google Classroom: An Exploratory Study Using PLS-SEM Approach," Education and Information Technologies, vol. 23, no. 6, pp. 2491-2510, 2018, [Online]. Available: https://doi.org/10.1007/s10639-018-9726-1.

[2] K.A. Azhar and N. Iqbal, "Effectiveness of Google Classroom: Teachers' Perceptions," Prizren Social Science Journal, vol. 2, no. 2, pp. 52-66, 2018, [Online]. Available: https://doi.org/10.32936/pssj.v2i2.45.

[3] M.A. Llego, "Utilization of Google Classroom in Online Teaching Amidst COVID-19 Pandemic: Perceptions of College Students," Laguna State Polytechnic University Research Journal, 2021.

[4] L.S. Tolentino and V.D. Mergal, "Effectiveness of Google Classroom as a Learning Management System in the New Normal," in Proc. DLSU Research Congress, Manila, Philippines, 2020.

[5] T. Paragas, "Challenges and Opportunities of Online Learning in the Philippines: A Google Classroom Case Study," Polytechnic University of the Philippines, 2020.

[6] S. Hsiang, A. Oliva, and R. Van Donkelaar, "The Effect of Climate Change on Learning Outcomes: Evidence from Heat Exposure in Developing Countries," Nature Human Behaviour, vol. 5, no. 7, pp. 872-880, 2021, [Online]. Available: https://doi.org/10.1038/s41562-021-01040-5.

[7] N. Banwell, R. Hayward, and D. King, "Disaster Risk Reduction and Education Continuity in Southeast Asia," International Journal of Educational Development, vol. 88, p. 102536, 2022, [Online]. Available: https://doi.org/10.1016/j.ijedudev.2021.102536.

[8] J.W. Creswell and V.L. Plano Clark, Designing and Conducting Mixed Methods Research, 3rd ed., Thousand Oaks, CA, USA: SAGE Publications, 2017.

[9] V. Braun and V. Clarke, "Using Thematic Analysis in Psychology," Qualitative Research in Psychology, vol. 3, no. 2, pp. 77-101, 2006, [Online]. Available: https://doi.org/10.1191/1478088706qp063oa.

[10] M. Händel, M. Stephan, M. Gläser-Zikuda, B. Kopp, S. Bedenlier, and A. Ziegler, "Digital Readiness and Its Effects on Student Satisfaction in Emergency Remote Teaching During COVID-19," International Journal of Educational Technology in Higher Education, vol. 17, no. 26, pp. 1-23, 2020, [Online]. Available: https://doi.org/10.1186/s41239-020-00199-x.

[11] F.P. Lansigan, R. Espaldon, and A.G. Ramos, "Climate Change and Impacts on the Philippine Education Sector," Philippine Journal of Science, vol. 150, no. 5, pp. 1027-1039, 2021.

[12] J.C. Gaillard and J. Navarro, "Disasters and Education in the Philippines: Resilience and Adaptation to Flooding," International Journal of Disaster Risk Reduction, vol. 62, p. 102390, 2021, [Online]. Available: https://doi.org/10.1016/j.ijdrr.2021.102390.