Journal of Information Systems Education

Volume 35
Issue 4
Fall 2024

Teaching Case

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Recommended Citation: Warner, J., & Cassidy, C. M. (2024). Teaching Case: The Customer Support Crisis at Ultimate Manufacturing Software, LTD. – A Diagrammatic Analysis. *Journal of Information Systems Education*, 35(4), 451-455. https://doi.org/10.62273/SOHZ8265

Article Link: https://jise.org/Volume35/n4/JISE2024v35n4pp451-455.html

Received:	July 7, 2023
First Decision:	September 26, 2023
Accepted:	August 2, 2024
Published:	December 15, 2024

ISSN: 2574-3872 (Online) 1055-3096 (Print)

Journal of Information Systems Education, 35(4), 451-455, Fall 2024
https://doi.org/10.62273/SOHZ8265

Teaching Case
The Customer Support Crisis at Ultimate Manufacturing Software, LTD. – A Diagrammatic Analysis

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ABSTRACT

Customer Service is important for a myriad of reasons, such as retaining customers, building customer loyalty, getting customer referrals, improving employee happiness, and remaining competitive. However, as a company grows, the focus may be on sales and production, with customer service efficiency and effectiveness being seen as an overhead expense, not a top priority. This case examines the issues found with a legacy customer service system and is based on an Academic Community Engagement class project (Carnegie Foundation – The Elective Classification for Community Engagement) using a real client. The case can be used in an undergraduate systems analysis & design or database class through requirements determination and/or analysis through modeling. The case focus is on identifying the current issues with the company customer service process and system, analyzing the issues, and creating a new customer service process workflow to address those issues. Assignment options for both data flow diagramming and business process modeling are provided, giving instructors the ability to choose which technical documentation approach fits best with their course material. Teaching notes, including Data Flow Diagrams and Business Object-Oriented Process Models (a variation of Business Process Models) for both as-is and a solution for to-be, as well as discussion questions, are available through the JISE website.

Keywords: Process modeling, Data flow diagram, Business modeling, Case-based learning

1. CASE SUMMARY

As the Director of Consumer Service (CS) at Ultimate Manufacturing Software, LTD. (UMS), Tim Jones (Jones, 2021) was very worried. He saw further decline in their CS support effectiveness as it was transitioned to work from home operations in March of 2020 when the COVID-19 pandemic hit full force. Ultimate Manufacturing Software is a midsize provider of enterprise resource planning (ERP) software for manufacturers worldwide. While the COVID-19 pandemic represented a disaster for many companies around the world, it should have been an opportunity for an ERP provider like UMS (Roffia & Mola, 2022). Many of the companies in the UMS target market ran their operations onsite in siloed functions using manual forms of data storage, so there was inefficient data sharing between functions and significant amounts of data redundancy. The need to digitize information and be able to share it, particularly remotely during the pandemic, required an information infrastructure like an ERP (Roffia & Mola, 2022), opening a significant window of opportunity for UMS. Unfortunately, the pandemic only accentuated the problems with the UMS's Customer Service processes instead of providing an opportunity for growth.

Jones believed that the existing customer service processes were the main roadblocks to the company's strategic goal of providing high quality service for all customer support reported issues. He needed to understand the strengths and weaknesses of their current processes to plan a workflow that would eliminate the inefficiencies. Fortunately, the Customer Service Representatives (CS Reps) were once again back in the office and Tim could have conversations with them about the processes. Also, Tim was working with a group of university students enrolled in a Systems Analysis and Design course at a university where UMS hired many of its programmers and customer service representatives. This initial project would benefit both the students acting as system analysts and UMS. After getting approval from the CEO to involve the students, Tim met with the several CS Reps then shared the conversations with the students to give them the background for the needed documentation. As an experienced systems analyst and developer, Jones knew the tools he wanted to use were Data Flow Diagramming (DFD) and variation of Business Process Modeling (BPM), known as Business Object-Oriented Process Modeling (BOOPM) (Venkatraman & Venkatraman, 2019). He directed the students to analyze the legacy system, identify the system's weaknesses, and produce the DFDs and BOOPM for a new and improved CS System.

2. INTRODUCTION

When Tim Jones, Director of Service at the enterprise resource planning (ERP) software vendor UMS, sent all Customer Service Representatives (CS Reps) home (with pay), in line with state and federal government stay-at-home orders on March 13, 2020, he quickly realized their Customer Service (CS) process was a bigger disaster than he had previously thought, with issues such as little integration between tiers on ticket resolution. This led to inefficiencies, such as redundant problem solving, since one tier might have resolved the issue, but another tier did not have the resolution information when a similar issue came through later. Jones also realized the open tickets or unresolved tickets were not being uniformly tracked and escalated for resolution, sometimes remaining open for months. UMS was in crisis mode with both the company's external customers and the internal customers – the CS Reps. If it was not fixed fast, they certainly would not be able to continue to grow as desired after the lockdown. Tim knew the first thing he needed to do was understand how the CS process worked and the issues, then determine what changes were needed to maximize the efficiency and effectiveness of that process. Only then would he rest at night knowing that his CS Reps could effectively provide the support their customers needed both now that they were back in the office and in the future should the number of customers increase as planned.

In preparing a set of recommendations to discuss with the senior management team the following week, he had two main goals in mind: 1) Understand the weaknesses of the current CS process, and 2) Develop a vision of what the CS process should look like.

Jones had heard many CS Reps voice their frustration with not being able to find answers to support issues quickly enough or sometimes not at all, but up until now, the company had other priorities that seemed more urgent. However, a CS crisis was brewing. The issues could no longer be ignored. Jones knew it was time to revisit with the CS Reps to verify what he thought the CS process was and address the issues in a tangible way.

3. COMPANY BACKGROUND

For over 50 years, UMS has provided Enterprise Resource Planning (ERP) software to firms operating in the manufacturing industry. While the pandemic was a global humanitarian and business crisis, it represented an opportunity for firms like UMS to respond to rapidly shifting supply needs, as it was a critical supplier of ERP software.

"Some UMS manufacturing clients in the electronics industry make components for medical devices such as ventilators. Some UMS clients in the textile industry are now producing face masks and other PPE [personal protective equipment] supplies. Other UMS clients … are also pivoting; they will soon produce clear plastic sneeze guards, face shields, etc. The list really goes on and on. Our software enables some of our clients to manufacture goods for the pandemic … on a national or global scale. Many organizations and millions of consumers will benefit from products that our clients produce, aided by our software" (Jones, 2021).

Founded in the 1970's, UMS was one of the first software companies to make its home in Austin, TX. In Spring 2020, UMS sold software to clients in many different manufacturing industries, including Aerospace, Automotive, Concrete Casting, Correctional, Defense, Display, Fixture, Electronics, Energy, Oil & Gas, Furniture, Job Shop, Machine Building, Machine Shop, Medical Device, Metal Fabrication, Packaging, Plastics, Printed Circuit Boards, Rubber, Slot Machine and Gaming, Soft Material, Truck and Trailer, and Wood. UMS provided ERP software to small and medium sized manufacturers who could not afford systems from companies like SAP but needed similar functionality for growth and efficiency.

Most of the company's 13,000+ clients were in the United States, Canada, Mexico, and Central and South America. In recent years, the company began to expand into Europe and Southeast Asia.

UMS's ERP software was typically installed on the client's computing system and maintained remotely by UMS's CS Reps. This configuration provided both the client and UMS with a preferred level of flexibility and security.

Jones (2021) said, "Our ERP software touches about 150,000 manufacturing employees every day, helping them work efficiently … [and] produce goods more effectively and at low cost. When (because of the pandemic) hundreds of thousands of valuable workers have been put out of work, we are helping thousands of other valuable workers be productive."

While the opportunity for UMS was evident to Jones and UMS's management team, they realized there was a major problem with the CS Reps not being collocated during the pandemic remote working period as their Tier 1 resolution rate fell below the previous mark of 35%. That meant more and more of the approximately 1,100 weekly tickets were being escalated to Tier 2. Tier 1 CS Reps were increasingly reporting frustration and concern with their inability to solve ticket issues, noting that it was hard to communicate with fellow reps to discuss issues they were unfamiliar with. Tier 2 CS Reps increasingly reported feeling overwhelmed with the growing workload of unsolved tickets being passed from Tier 1 that previously were solved by face-to-face conversations with Tier 1 CS Reps. Jones knew that collocation was not the efficient method of sharing knowledge they needed to grow and set out to improve their processes.

4. LEGACY CUSTOMER SERVICE OPERATIONS

Jones thought the best place to gather details to document CS operations was with their onboarding process for new CS Reps now that they were back in the office. In a six-week initial training period, CS Reps were taught to use the Integrated Tracking and Resolution System (ITARS) and the Decision Algorithm Manual (DAM), a Word™ document designed to address typical problems that were simple to correct. UMS workstations were equipped with large dual monitors, webcams, and headsets, and were integrated through UMS internal servers. All CS Reps could share their screens with clients, observe client problems first-hand, and access clients' ERP systems to facilitate software installation and repairs using instructions in the DAM.

He went over to the Tier 1 CS Reps area and spotted Sarah, their newest hire. He thought Sarah would be a great person to start with as he greeted her and asked her to describe what she understood from the orientation training she had gone through.

Sarah was eager to share what she had learned. She took a deep breath and began. "I was told UMS clients were instructed to directly contact CS whenever they encountered problems

with UMS software or otherwise needed technical assistance. First things first, the call is logged in the ITARS and assigned to a Tier I CS Rep like me and I evaluate it. If I think it is something I can resolve I log into the ITARS for Tier I issues to prioritize, track, and document the resolution of the problem. Once a resolution is reached, I send a notification to the client detailing the resolution. I really like it when I get the missing patch update issues, as long as they don't go back too far. I've been able to take care of those tickets from beginning to end myself. So, after I've come up with the solution, I am supposed to use GoToMeeting software to screen share and walk the customer through the fix and/or explanation of the solution. I'm supposed to write up all the information in the ITARS for future reference, although Mike, you know Mike—can't remember his last name, told me we get so busy, and the ITARS is not very user friendly, that sometimes not everything gets documented. Sometimes the resolution is a quick call to the client with instructions on what to do. But he said not to worry because with experience I'll know how to fix a lot of issues off the top of my head. Also, I can just pop my head into another cubicle now and ask if someone knows the fix to my issue if I don't know it and can't find it in the DAM."

Jones then asked what would happen if she could not resolve the issue. Sarah replied, "Oh, that's easy. I turn it over to a Tier II CS Rep who takes it from there, unless it looks like a programming bug fix, and then it goes to the Research and Development Department. I think that's called escalating the ticket."

Jones thought for a moment and then asked, "How do you learn about the resolution once the Tier II CS Rep, R&D, or Custom Group take over a ticket?"

Sara replied, "I don't think I get any feedback, but then again I've only been shadowing Jim Matthews for a short time."

Jones knew ITARS was a standalone system (not integrated with any other software or system), and each of the three CS Department Tiers maintained their own ITARS files, so it made sense that escalated ticket resolutions may not be shared.

Jones decided to talk to Tom, an experienced Tier II CS Rep, as his next step in verifying the CS data flow and processes. Jones walked towards Tom's cubicle on the east side of the building, past the Tier I workstations. There were about 25 Tier I CS Reps and 50 Tier II CS Reps on any given day. In many instances, Tier I cubicles were on one side and Tier II were on the other side of a cubicle wall. As he passed one set of cubicles he overheard Beth, a Tier I CS Rep, talking with Ben, a Tier II CS Rep, over their mutual cubicle wall.

Beth seemed frustrated pleading, "Ben, please help me. I have George at Wilson's Welding and he's saying you helped him with his inventory problem a couple of months ago, but I can't find the fix in the DAM or the ITARS."

Ben thought for a moment and then hesitantly replied, "I remember that call, it was a data problem I think, putting an extra asterisk in the middle of the inventory item name. FYI if you haven't learned about that yet we use an asterisk as a delimiter, so having more than an asterisk at the beginning of the inventory item name and at the end causes a problem. But I'll have to get on his system and see exactly what went wrong this time. Just transfer him over and I'll finish up the ticket."

Jones wondered if the transfer was being documented and how their time on the call would be recorded. He made a mental note to ask Cynthia, the CS Coordinator, about this and continued walking, stopping at Tom's cubicle where he found him finishing up on a CS call. A perfect time to have a discussion, he thought.

Tim started, "Tom, you might have heard we are working on upgrading the CS system. Can you tell me about this call you just finished up? I want to make sure I understand how Tier II tickets are resolved and how CS works right now. Can you tell me what you do when a call gets assigned to you?"

Tom replied, "Sure, Cynthia assigns an escalated ticket to me. I check it and prioritize it with my other in process tickets. If I have prior experience with the issue, I usually can resolve the ticket quickly and send the ticket resolution to the customer."

Tom continued, "If I don't have prior experience, I look in the ITARS for a similar issue and/or I'll check with the other Tier II Reps to see if they know the solution. If it is in the ITARS, I use the documented solution. Otherwise, if one of the other reps has a solution, I use that solution to resolve the ticket, update ITARS, and if there was a Tier I Rep who started the ticket I can notify them of the solution. If I think the issue is a program bug, I refer the ticket to our R&D Department. I might even look at the code first and see if I can figure out a fix to pass on to R&D. I've really gotten into coding lately, so I'm thinking I might ask for a transfer to R&D. Do you think that's a possibility?"

Jones smiled and said "You know I would hate to lose you Tom, you're one of the best Tier IIs we have. But R&D is always looking for a good coder who understands the user side of the program. Just make sure you don't spend too much time looking at the code until you do transfer to R&D, then you can get into it all you want. Anything else you can think of that you're doing with a ticket?"

Tom replied, "No, that about does it."

Following up on that, Jones asked, "Oh, one other question. I know this almost never happens to you, but what if no one in Tier II can resolve the issue? What do you do?"

Tom replied, "The issue is logged into the open tickets log, and I notify the user that it is being worked on."

Just then Tom's phone rang, as another support call came in. Since Tom would be busy for a while, Jones took that as an opportunity to move on to the R&D Department, located on the other side of the building. On his way he passed by Cynthia again. "Anything interesting happening today?" he asked her.

"Yes, we have a full house today. All 25 of the Tier I Reps are on board today, and 45 of the 50 Tier II Reps are here. They all are busy it seems; we have a lot of backlog to work through. I wish we had a better way to share ticket resolutions."

Cynthia sighed. Her request was not lost on Jones. He kept thinking they could be much more efficient and therefore effective if they could break down the barriers between their information silos.

Walking through the door into the R&D Department, Jones said hello to Carlos, who was the R&D Coordinator. "How is the support load today?" asked Jones.

Carlos replied, "It's been slow, not many code issues this week."

Jones asked, "I'm reviewing our handling of customer support requests. Could you review with me the process that occurs when support tickets are referred to R&D? Can you tell me what you do with a support ticket that is transferred here?"

Carlos replied, "Sure. The ticket is emailed to me usually from a Tier II CS Rep. I check the description to see if it appears to be a programming issue and not something else, like a data

issue, and if it looks like a programming issue, I log it into our issue log as accepted and see who is available to work on it. I also record the ticket in our program version control file to start the tracking of any program changes that will be made. Once I figure out who is available, I assign the ticket and record the assignment detail in the program version control file as well. The programmer who gets the assigned ticket starts working on the ticket."

At that moment Aneika, one of the programmers in the R&D Department, walked up. Carlos immediately introduced Aneika, "Tim, you know Aneika, don't you?"

Jones replied, "Yes, I do. What great timing Aneika. I am here to talk to an experienced programmer, and you are just the person who can help me."

Aneika replied helpfully, "Ok. I was just about to ask Carlos if he had any tickets coming in because I just finished wrapping up my current issue, so what can I help you with, Tim?"

As they began walking back to her cubicle, Jones asked. "Can you walk me through the ticket resolution process you follow?"

Aneika explained, "After I receive a ticket that has been identified as a program issue, I investigate the program and see if I can determine what program change is needed. If I determine that software changes are needed, I document them, update the version control log with the needed code change, and notify the customer when the program update will happen. That's the easy fix. If I cannot diagnose the problem right away, I will continue to work on it for a couple days. If I still cannot diagnose the problem after a few days, I document the ticket as unresolved and let the customer know it is still in process."

Aneika shook her head concluding, "That's hard, telling our customers bad news, that the issue isn't resolved. I dread that."

Jones nodded "I understand. Giving bad news frustrates everyone. I think I got what I needed. Thank you for the help."

Aneika asked curiously, "Just wondering what you are checking up on?"

Jones replied, "I'm hoping to improve the CS process and wanted to make sure I knew what we were currently doing."

Jones waved goodbye and walked towards the door. He headed back to his office to start the documentation for the students who would be working with him. His conversations with the customer service people confirmed what he already knew. As he sat down at his desk, he outlined some additional background information pertaining to the three customer service Tiers:

- Tier I: The 25 Tier I CS Reps answered incoming calls and collected initial information about the client's problem or request for service. More than 60% of service calls were solved by Tier I Reps, typically in five to 30 minutes (although rare, problem resolution could take one to two hours). An example of the type of problem handled by Tier I CS Reps might be resolving an error code due to the client importing an incorrectly formatted payroll data file. The DAM helped CS Reps address many common problems, but not complex problems. If a Tier I CS Rep judged the client's problem to be complex, the CS Rep would refer that client to a Tier II CS Rep.
- Tier II: The 50 Tier II CS Reps were more experienced with UMS's products and the range of problems experienced by clients. Because they were co-located with the Tier I Reps, the Tier II CS Reps were able to provide informal assistance and peer training by talking between cubicles. The value of this informal collaboration depended heavily on specific knowledge and experience of the individual CS Reps on duty at a given time. The problems directed to the Tier II CS Reps were more subtle; these required an ability to distinguish between software configuration errors, operator errors, and programming errors. Thus, Tier II CS Reps worked closely with clients and collaborated extensively with several other UMS departments. Resolution might take up to seven days. If a Tier II CS Rep determined that the client's problem was due to a software error, they would pass responsibility on to Tier III programmers in the Research and Development department.
- Tier III: Personnel in Research and Development were the ERP software programmers. They were responsible for determining how best to modify UMS software to correct mistakes or add new capabilities. Many of the problems directed to Tier III resulted from errors in the UMS software. These errors were sometimes tricky to fix (because, for example, a change in one module might cause a problem in one or more other modules). Tier III programmers tracked ERP program fixes in a version control file maintained by the R&D group.

5. DIRECTION FOR NEW CUSTOMER SERVICE SYSTEM

When meeting with the students Jones shared some specific complaints about the current customer support system. "In cubicles, over-the-wall communication is easy and quick," he said. "Whereas, messaging, phone calls, or email were slow problem-resolution mechanisms. [Pre-COVID,] we were limping along, but there was no sense of urgency to make an improvement" (Jones, 2021).

Reflecting on the department's past performance, Jones knew that current processes and procedures delivered high quality CS most of the time. However, capacity constraints caused some client frustration, as reflected in client feedback such as these comments (Jones, 2021):

- "Getting technical help – many times you are told this is the first time anyone has experienced the issues."
- "Response time can vary significantly, from an almost immediate response to days after submitting a request."
- "There are hassles after upgrades, and limited support for older versions is a problem."

In his presentation to the senior management team, Jones would need to argue his case for change. Jones knew their legacy system did not provide the platform they needed to successfully service their customers. He needed to document the strengths and weaknesses of their current service processes, identify the "pain points" or inefficiencies, and identify a workflow that would eliminate those inefficiencies. He had a lot of hard work to do. Fortunately, he had a classful of bright, eager students to help get the project started in the right direction.

6. ASSIGNMENTS

Students should assume the role of the students who worked as systems analysts for Tim. The modeling would provide a means to:

1. Depict a suggested redesign of the data flow process to address the identified process problems.
2. Depict a suggested redesign of the business process to address the identified process problems and map in a to-be BOOPM.
3. Write a short narrative to identify and support how the redesigned workflows eliminate current process problems.

The specific steps that the students used in the class were:

1. Create data flow diagrams (DFDs) to describe the existing (as-is) CS system.
2. Analyze the existing system. Identify strengths and deficiencies such as bottlenecks or other threats to data quality or service quality.
3. Create a revised or new design of the CS system as depicted in new DFDs.
4. Use Business Object-Oriented Process Modeling (BOOPM) to describe the existing (as-is) CS system.
5. Analyze the existing processes. Identify current process problems.
6. Create a revised or new design of the CS system as depicted in new BOOPM.

7. REFERENCES

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AUTHOR BIOGRAPHIES

Janis A. Warner is an associate professor of management information systems at Sam Houston State University. Before receiving her Ph.D., she worked for 23 years in the private sector for organizations including Accenture and Pulte Homes in roles like IT Support Manager, Internal Auditor, Division Controller and Systems Design Manager. This experience led her to develop a passion for a user-oriented, experiential approach to systems analysis and design. She has partnered with the SHSU Small Business Development Center for 16 years to support local businesses and not for profits with consulting through her classes. Dr. Warner looks to share these consulting experiences with case studies. Her research interests include human behavior and information technology security, project management, and case study pedagogy.

Christopher M. Cassidy is an associate professor of management at Sam Houston State University. He teaches in the areas of strategic management, business ethics and corporate social responsibility (CSR), and entrepreneurship. He is a strong advocate for experiential learning methodologies such as cases, exercises, games, and simulations. His research interest areas include strategy implementation, the resource based view (RBV), organizational control systems, and business ethics. He has served in leadership roles in the North American Case Research Association (NACRA), the Association for Business Simulation and Experiential Learning (ABSEL), and the Southeast Case Research Association (SECRA).

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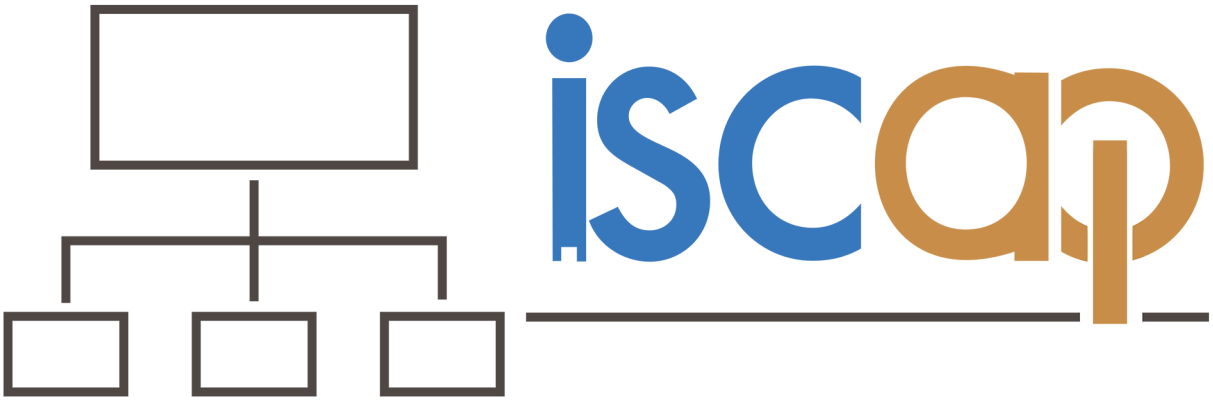

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ISSN: 2574-3872 (Online) 1055-3096 (Print)