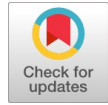


A Knowledge Management Model to Improve Strategic Planning and Decision Making in HEIs

Subhashini Sailesh Bhaskaran



Abstract: Knowledge management practices in Higher education institutions can lead to better decision making, better curriculum development, and research, enhanced academic and administrative services and better utilisation of resources (Kidwell et al., 2000) [6]. Moreover, the advancement in the field of Data Mining and big data science has opened up significant opportunities for these institutions to create, manage, protect and disseminate knowledge effectively. This paper presents a knowledge management model to enhance the research processes, teaching and learning processes, student and alumni services, administrative services and processes, strategic planning and management. This paper uses data mining and big data science techniques to unearth the knowledge hidden in student information systems to enable improved HEIs management and progress.

Keywords: Strategic, Making, knowledge, learning processes, planning, HEIs

I. INTRODUCTION

Higher Education Institutions (HEIs) play out a significant role in the information based economy. As learning organizations, they will have the option to broaden information aptitudes, produce top quality alumni, upgrade advancement and imagination and contribute adequately to the information creation and protected innovation improvement (Kok, A., 2007) [7], (Abdullah et al., 2005) [1]. The expansion of information resources is itself the seeds of higher education and it obviously adds to the eventual fate of financial and social improvement. Indeed, Knowledge Management (KM) is gaining acknowledgment in the scholastic segment over the most recent couple of years, when it turns out to be certain that colleges have a significant task to carry out in the information economy, bringing new difficulties for HEI (Abdullah et al., 2005) [1], (Bhusry and Ranjan, 2011) [3], (Sedziuvienna and Vveinhardt, 2009). Agreeing a few authors (Sedziuvienna and Vveinhardt, 2009), (Hoveida and Hooshmand, 2008) [5], we can recognize two viewpoints of information in HEIs: i) scholarly information, coming about because of learning and educating exercises, the main role of colleges; ii) hierarchical information, which alludes to information on the general business of an establishment: its qualities, shortcomings, systems, basic factor of achievement, associations with inquire about focuses, and so forth.

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These two points of view of information could be improved by a lot of KM practices and instruments that encourage the advancement of an condition of information creation, coordinated effort and sharing (Bhusry and Ranjan, 2011) [3], (Alavi and Lediner, 2001) [2]. Due to the presence of new information makers in HEIs, an ever increasing number of colleges are investigating the plausibility of applying corporate apparatuses. Advancements are critical to encourage KM exercises, for example, discovery or acquisition (explore), broadcasting or sharing (instructing), application good information and their safeguarding (libraries, storehouses) (Maponya, 2005) [8], (Bhusry and Ranjan, 2011) [3], (Pinto, 2013) [10]. Then again, these issues miss their significance if the foundation doesn't have a methodology and a set of institutional practices which lead to making, sharing and teaming up between the different entertainers over the association (Maponya, 2005) [8], (Alavi and Lediner, 2001) [2]. In this research, the authors discusses about the idea of information the executives in HEI, trailed by a systematization of information practices and apparatuses to connecting the few on-screen characters (students, instructors, scientists, secretariat staff, outside elements), and advancing the information sharing over a few key procedures and administrations in a HEI, for example, the exploration forms, learning procedures, understudy and graduated class administrations, authoritative administrations and forms, and key arranging furthermore, the board. The paper likewise presents and talks about a system to improve information sharing and cooperation in a HEI and then finishing showing an instance of strategic planning and decision making using student complaints data using data mining.

II. KNOWLEDGE MANAGEMENT IN HEI

KM is turning into a significant issue in higher education, which drives the capacity of gather and dissect data, change information and apply oddities (Bhusry and Ranjan, 2011) [3]. It is important to call attention to the significant information, make a philosophy for accepting and combining information, to perform spread of information among the students and staff, and to produce new information and development through information sharing (Sedziuvienna and Vveinhardt, 2009), (Santos and Wane, 2013) [13]. Bloch (Santos and Wane, 2013) [13] contends that information has become a key vital asset, important to thriving and intensity. HEI will encounter strengthened weight, impacted by the information economy and furthermore the globalization, with progressively interconnected substances and where information, inventiveness and advancement are the basic components for seriousness (Cranfield and Taylor, 2008) [4]. Kidwell et al.



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(Kidwell et al. 2000) [6] contend that KM is essential to HEI, bringing significant advantages to instructive foundation procedures, for example, inquire about, educational plan improvement, understudy and graduated class administrations, authoritative administrations and key arranging. The test is to convert the information that at present lives in each singular/administration, and make it generally and effectively accessible to any employee, staff individual or different on-screen characters. Bhusry and Ranjan (Bhusry and Ranjan, 2011) [3] pointed that the principle challenge in HEI is to make an information condition, and the acknowledgment of information as scholarly capital. Viable KM requires noteworthy change in the way of life and qualities, authoritative structures, rehearses and frameworks. Moreover, a few investigations uncover the incipient idea of KM in HEI and the critical need to receive data advancements that address the necessities of the activities and rehearses (Bhusry and Ranjan, 2011) [3], (Ramakrishnana and Yasin, 2012) [11], (Lindval and Sinha, 2003).

Over the most recent years, critical work has been done in the field of KM in HEI, centering on rehearses, devices, activities, assets and systems to oversee hierarchical information,

expanding its dispersal and its utilization (Abdullah et al., 2005) [1], (Bhusry and Ranjan, 2011) [3], (Sedziuvienka and Vveinhardt, 2009), (Ranjan and Khalil, 2007) [12], (Suci, Piciorus and Imbrisca, 2012) [14]. A few systems have developed with the point of improve KM in HEI. These systems center on an assortment of points of view, as indicated by a short writing survey (Bhusry and Ranjan, 2011) [3], (Sedziuvienka and Vveinhardt, 2009), (Kidwell et al. 2000) [6], (Ranjan and Khalil, 2007). A few authors point to the execution of data frameworks, others allude to informal organizations, information rehearses, work process frameworks or authoritative strategies, so as to deal with the creation and transmission of organized and unstructured information. Then again, practically these structures contain a lot of information procedures to help, upgrade information exercises and assets. (Sedziuvienka and Vveinhardt, 2009) incorporate the information procedures of recognizable proof, creation, stockpiling and sharing information in their system. (Alavi and Lediner, 2001) [2] allude to information creation, capacity/retrieval, information move and application. The European Guide for good Practice in KM alludes to the information procedures of creation, stockpiling, offer and use, too as different authors. In any case, it ought to be noticed that ongoing approaches point that information is indistinguishable from its holders, its advancement speaks to a consistent procedure dependent on the schedules and exercises embraced by people (Santos and Wane, 2013) [13]. The creation and sharing of information includes social collaboration and personal correspondence and coordinated effort (Bhusry and Ranjan, 2011) [3].

For the most part, these procedures infer getting the hang of, watching the forms (learning by doing), commitment by and

by and social connection. Right now, is naturally connected with ideas, for example, constant learning, development, correspondence, cooperation, and culture of sharing (Santos and Wane, 2013) [13], (Nonaka and Kono, 1998) [9].

Agreeing a few authors (Kok, A., 2007) [7], (Sedziuvienka and Vveinhardt, 2009), (Van, 2013) [15], HEI have numerous particularities and specificities, which ought to be taken into thought, since they sway the information the board issues:

- An enormous number of students, with various objectives, extraordinary interests and heterogeneous profiles. The massification of higher education and the expanding versatility of students on trade programs, underlined this heterogeneity.
- Students from various nations, with unmistakable societies, dialects and aptitudes;
- The decent variety of preparing offer, with a few courses that try to create aptitudes and skills in various regions of skill;
- The requirement for students to partake in look into, improvement and advancement forms, and the emphasis on educating and learning for new students and learning for new objectives;

This heterogeneous and logical nature which is found in real higher education, has carried various difficulties to information the executives in the HEI. To address these difficulties, a wide assortment of information the board rehearses have been proposed by analysts and experts, to improve the forms alluded to previously. These practices might be seen as an organized arrangement of exercises that add to KM, upheld by mechanical devices, additionally called information the executives frameworks.

Utilizing information the executives' procedures and advancements in higher education is as essential for what it's worth in the corporate division. Whenever done adequately, it can prompt better decision making capabilities "item" advancement process duration (for model, educational program advancement and inquire about), improved scholastic and authoritative administrations, and decreased expenses.

Depending on the institutional information of novel people can hamper the adaptability and responsiveness of any association. The test is to change over the data that right now dwells in

those people and make it generally and effectively accessible to any employee, staff individual, or other constituent. An institution wide way to deal with information the board can prompt exponential enhancements in sharing information—both explicit and implicit. Kidwell et al. (Kidwell et al. 2000) [6] has listed how application of knowledge management could help a number of university processes and services: the research process, curriculum development process, student and alumni services, administrative services, and strategic planning.

Table 1: Application of KM in HEI and its benefits (adapted from (Kidwell et al. 2000) [6]

<p>KM for Student and Alumni</p> <ul style="list-style-type: none"> • Portal for student services for both students and for faculty and staff at the institution so that they are well informed to advise students. • Portal for employment services • Information of student affairs services for faculty and staff to make sure all understand existing services and can provide proper advising. • Portal for alumni and development services to minimize redundant efforts; capture contact reports; and link to research, curriculum, and career development efforts. • Portal for information on outreach constituents to integrate efforts and minimize redundant efforts. 	<p>Benefits</p> <ul style="list-style-type: none"> • Enhanced services for students. • Enhanced service capability of faculty and staff. • Enhanced services for alumni and other external constituents. • Enhanced effectiveness and efficiency of advising efforts
<p>KM for Administrative Services</p> <ul style="list-style-type: none"> • Portal for monetary services • Portal for procurement • Portal for human resources 	<p>Benefits</p> <p>Improved effectiveness and efficiency of administrative services.</p> <ul style="list-style-type: none"> • Enhanced ability to identify improvement efforts. • Improved ability to support the trend toward decentralization (for example, local business centers) by providing guidelines for consistency. • Improved compliance with administrative policies such as procurement, preferred vendors, procurement card policies, budgeting procedures, affirmative action guidelines, and so forth. • Improved responsiveness and communication capabilities

This research paper focuses on applying knowledge management on student administrative services in order to improve the efficiency and effectiveness.

III. STRATEGIC PLANNING AND CRM IN HEIS

A. Strategic Planning:

Introduction of knowledge management into an HEI is a strategic issue, and therefore permits a proper strategic plan. This plan must include Customer Relation Management (CRM) function and other supportive purposes and procedures. The supportive functions and processes must also be advanced or supported for the possible of knowledge-based CRM to be fully realized. Adopting knowledge management also requires a strategic review of the enterprise business model to deduce its effects and challenges of implementation. Viewing knowledge management just on an operational level would not be sufficient as it involves issues of change management, corporate culture, leadership, and competency development, all of which would have major impact on the business model and competitiveness of the enterprise. Strategic planning process includes the following steps: 1. situation analysis; 2. scenario planning; 3. strategic options; 4. implementation; 5. performance management; and 6. review and adjustment.

B. Customer Relationship Management (CRM):

Regardless of the numerous investigations that have been done, especially in west (Bose and Sugumaran, 2003; Brenner et al., 2005; Campbell, 2001; Gibbert et al., 2002; Stefanouet al., 2003), relationship between Knowledge Management (KM) and Customer Relationship Management (CRM), none of them are complete enough to catch all the variables into

one single system. As indicated by Bose and Sugumaran (2003), genuine CRM could be accomplished uniquely through incorporation of KM with it which as the result improves business forms and permits firms to have a decent assessment on their customer's degree of 'fulfilment, productivity and devotion'. They likewise pinpoint the absence of a simple and general structure for incorporation of CRM functionalities with knowledge management abilities (Bose and Sugumaran, 2003). Today, the present test for associations is to build up a coordinated CRM platform. This stage empowers associations to gather pertinent information about customers from existing client interfaces. In spite of the fact that organizations approach tremendous sum of information about their clients like their social activities, they despite everything know little about how to deal with this information and utilize the best out of it (Campbell, 2001). Blast et al.(2005) recognizes that effective CRM requires profound information on customer(Knowledge Management), however the manners in which that these two sorts of innovation fit in together needs examine. Also, past investigations attempting to interface KM and CRM have been constrained in scope and the outcomes been influenced by regularly methodological limitations or mistakes. A significant number of the past examinations have utilized subjective strategies (for example case studies, literature survey) (for instance, see Gibbert et al., 2002; Brenner et al., 2005; Campbell,2001; Halinen and Rollins, 2005;

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Gao and Li, 2006) to close their exploration findings and some other hardly any examinations have utilized convincing insights (for instance observe, Stefanouet al., 2003). Consequently, so as to cross over any barrier and furnish associations with assistance in managing the board viewpoints of KM's impact on CRM performance, this paper proposes a lot of KM basic factors and builds up a proposed model to show the connection between KM basic components and CRM.

The primary center of CRM is to screen clients' conduct for better comprehension of their ever changing needs and inclinations. By planning and utilizing this information, association can provide predominant assistance for clients and logically improving this greatness by communicating with them through various channels. In view of what organizations have learned about their clients through numerous channels and various offices, for example, promoting, deals and so forth., they ought to have the option to treat every individual customer differently and conveying items and administrations alongside supporting data in order to address their particular needs and issues (Bose and Sugumaran, 2003; Mithas et al., 2005; Peppers et al., 1999). CRM can be characterized as a hierarchical wide methodology to change an association to a client driven association by securing chosen vital clients and developing and keeping up long haul advantageous associations with them. This long term relationship will be engaged by utilization of their insight and data which as its ultimate reason, it improves client service and builds association's revenue and benefit (Buttle 2001; Could-well 1999; Gosney and Boehm 2000; Kim et al., 2003; Parvitiyar and Sheth 2001; Payne and Frow, 2005; Singh and Agrawal 2003). CRM is one the most significant segments among authoritative procedures due its capacity to recognize clients, begin information, make associations with them and exhibit their knowledge about the organization and its items (Llamas and Sule, 2004). Moreover, CRM encourages associations to alter their items and administrations and meantime increase the quality to make more an incentive for clients and increment client retention by intriguing and keeping up significant and productive clients and excusing the invaluable ones (Kim et al., 2003; Romano and Fjermestad, 2003). As per Payne and Frow (2005), the way that associations characterize the CRM unequivocally influences the method of CRM acknowledgment and practice in associations and one of the most dangerous choices that associations can make in regards to CRM execution is installation of CRM before production of a client centered condition in organization or in different words, before changing themselves to a client centric organization (Rigby et al., 2002). CRM is an administration approach that associations attempt to distinguish and developing-profundity information about their clients' practices and inclinations. At long last they adopt systems and create programs for creating and holding successful relationships with their clients to keep up and keep the privilege and profitable customers (Parvatiyar and Sheth, 2001; Stefanou et al., 2003). In this way, the main focus of CRM is on building up and continuing a "devoted and stable client base" through arrangement of astounding support of clients, supporting them and offering products dependent on their requests. At last, as a definitive result of CRM initiative,

organizations can gauge the degree of consumer loyalty and the worth of relationship with their clients (Halinen and Rollins, 2005).

In HEIs customers are students. In literature there is more focus on curriculum development, strategic planning etc. The services offered to students from faculty and administrative staff is less researched as knowledge management. Further CRM in HEIs is still under researched and KM with CRM in HEI has a lot of potential for unearthing strategic planning and decision making in HEIs. This strategic planning and decision making is expected to favour students enhancing the relationship with HEIs. This research is utilising CRM with KM of administrative/students services to facilitate strategic planning and decision making in HEIs by investigation of student complaints/inquiry module data of a university.

IV. DATA MINING (DM) AS KM TOOL

From the viewpoint of KM process, DM shows up as an instrument for knowledge creation. As such, the disclosure of new information and concealed example of hierarchical recollections that pointed by information creation is made conceivable with DM. DM can be depicted as a procedure that permit clients to recognize information structure, measurable, scientific, man-made brainpower and AI system to separate and recognize helpful data and fitting information from huge databases (Lawal, Odeniyi and Kayode, 2015). Silwattanusarn furthermore, Tuamsuk (2012) portrays information mining as a stage in the information revelation in databases process that produces reasonable plan or model from information. The writing recommends numerous DM strategies as instruments for information creation from hierarchical information and recollections.

For moment, association rule is perhaps the best datum mining systems that has been polished in different ventures that contain a major measure of information, for example, general store, telemarketing, protection misrepresentation and others. As indicated by the past examinations as referred to by Buttar and Kaur (2013) featured that affiliation rule can be considered as a solid device for showcase examination to explore the conduct of clients, what item consistently bought by the client and others. Therefore, this information and data might be valuable for chief in delivering a decent vital choice. Association and classification rule disclosure are comparative, then again, actually association rules revelation can figure any attribute in the data set while classification involves the forecasting of only one attribute.

Classification focuses on data mining methods that are being utilized for such purposes (Harshna and Navneet Kaur, 2013). Fayyad et al. (1996) defined classification as a discovering models that arrange data into different predefined classes. The classification task is described by the welldefined classes and furthermore preparing set containing of predefined models. Data mining is an amazing new innovation with an incredible potential that can be utilized to extricate the concealed prescient data from enormous databases.

DM instruments conjecture the future business pattern in request to permit business to settle on proactive information driven choice (Folorunso and Ogunde, 2004). Bora (2011) asserted that data mining can be a strategy or apparatus for choice help that can be drilled in various regions just as in showcasing. Likewise, Ding (2010) additionally referenced that DM can play an imperative capacity in improving the promoting choice in any achievement organizations. As per the past investigation, as referred to by Ali and Bach (2014) express that DM become increasingly well known due to the contributions that can be made in changing data to information and furthermore can help advertiser to anticipate so as to settle on a decent choice for advertising. In this way,

it tends to be outlined that DM is a special system or apparatuses that can be utilized to change the data into information in getting ready dynamic to help an association or classification accomplish their business objective and increment their presentation. The KM and DM are broadly applied in numerous fragments of human exercises. Information mining has been set up in different territories, for example, in account, fabricating designing, retail enterprises, DNA investigation and others (Ruhaizan, Zalinda, and Azuraliza, 2009). So this research will use Data mining as knowledge discovery tool in knowledge management of administrative and student services.

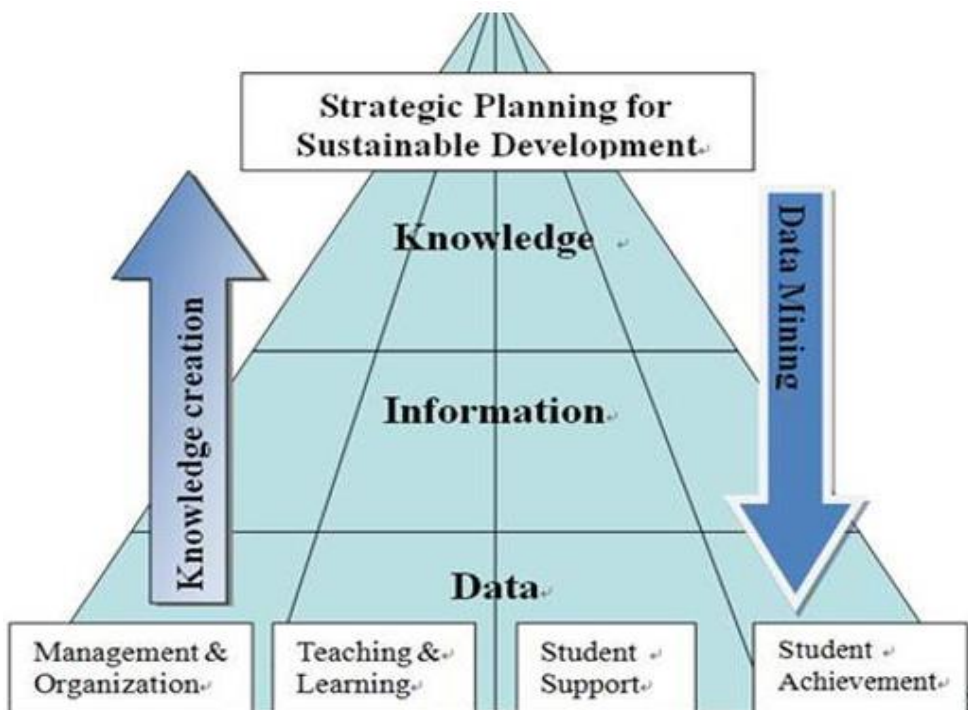


Fig. 1: Knowledge Management and Data Mining

V. KNOWLEDGE MANAGEMENT MODEL FOR STRATEGIC PLANNING AND DECISION MAKING- RESULTS AND DISCUSSION

A student complaint/enquiry module was introduced in the Student information system of a university in Bahrain. The purpose of this module is to allow students to raise their complaints/concerns/enquiries about different services offered by the university including complaints against staff/faculty. In this module the complaints/enquiries received from students is processed by an officer automatically through the system and depending on the type, the case will be forwarded to respective in charge faculty/staff to follow-up. Then after attending to the case finally the case is again forwarded back to the officer to review the case and notify the student through the system. In this research, the following dataset is retrieved from the system in order to analyse and unearth the hidden information present in the data so as to understand the complaints/enquiries that are affecting the students the most and its reasons. This analysis would help in finding out or understanding the pattern of complaints/enquiries so as to take corrective action and prevent future cases. The future cases could be prevented by

making strategic decisions that could possibly upgrade the reputation of the university. By avoiding future cases, the relationship between the students and the university could improve there by student satisfaction is achieved which act as indirect marketing for the university thereby improving admission rates.

Field	Remarks
Complaint type	Types of complaints received from students
Programme	Programme of the student
Year of the student	The year in which the student is studying
Number of students	Number of students

A total of 6161 complaint records were processed.

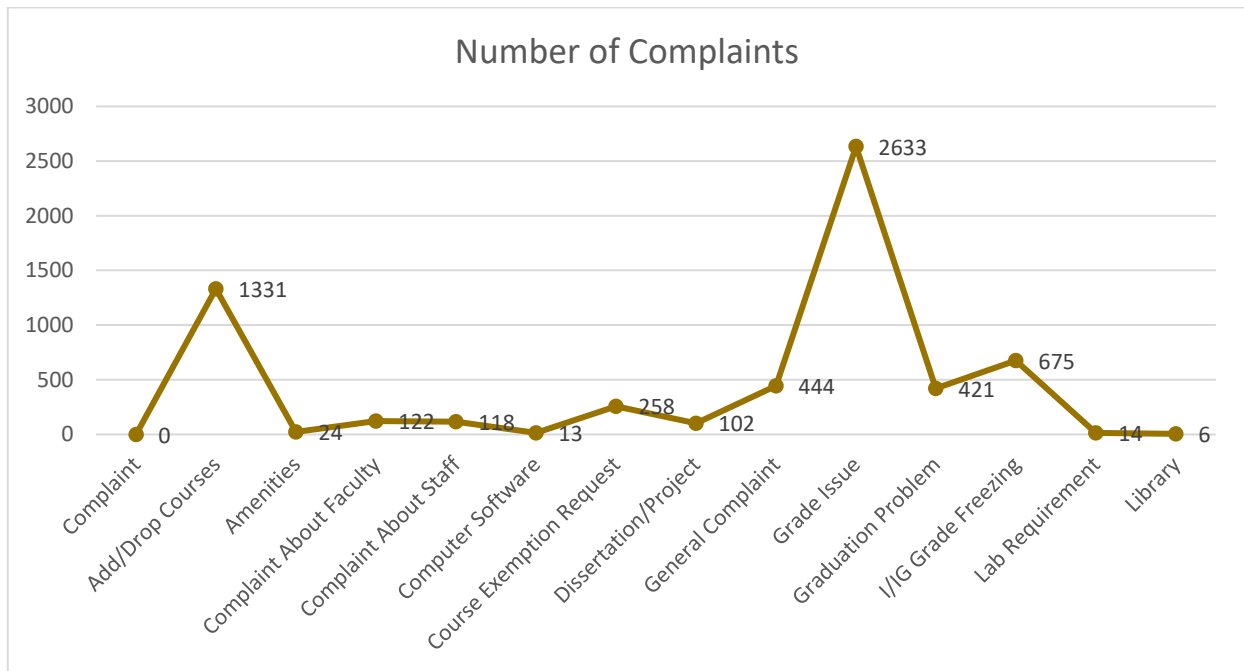


Fig. 2: Data visualisation graph showing the distribution of complaints

The above data visualisation graph shows the distribution of complaints over different categories. This shows that Grade issue has the highest complaint of around 2633 cases followed by Add/drop courses with 1331 cases. When association rules Apriori algorithm was applied to the data it was found that there is a link between the year in which the student is studying to the type of complaint. However Grade issue and add/drop are the top most complaints for all years of students. In year 2 and 3 student attendance and tuition fees are other higher issues while in year 4 tuition fees and other miscellaneous issues are there.

Table 2: Total Inquiry/Complaints by type

Year	Inquiry type	Count
1	Others	10
2	Graduation Problem	38
2	Others	75
2	Student Attendance	25
2	Tuition Fees	59
3	General Complaint	116
3	Others	280
3	Student Attendance	180
3	Tuition Fees	147
4	Others	224
4	Tuition Fees	163

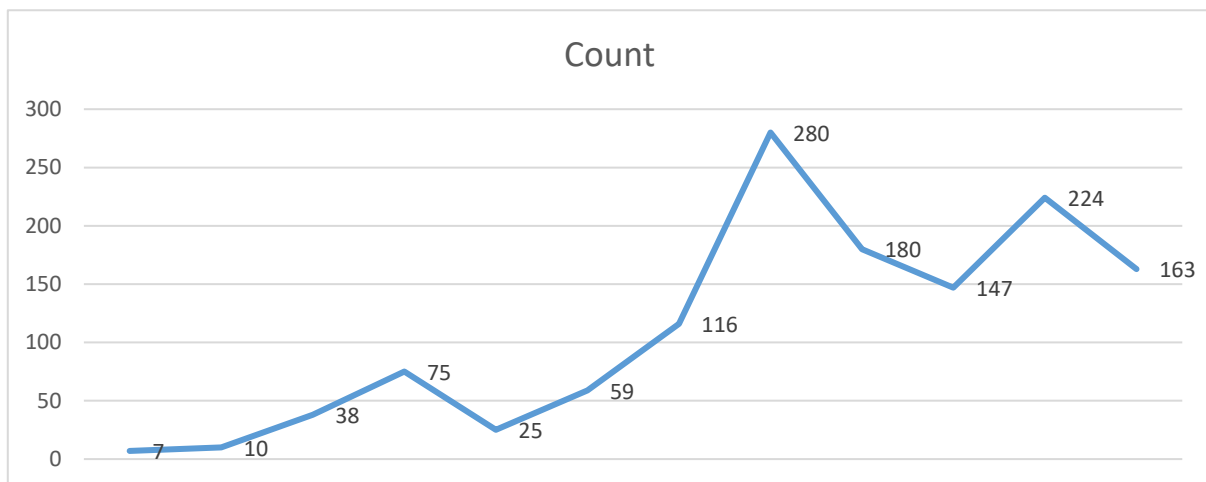


Fig. 3: Total Inquiry/Complaints by type



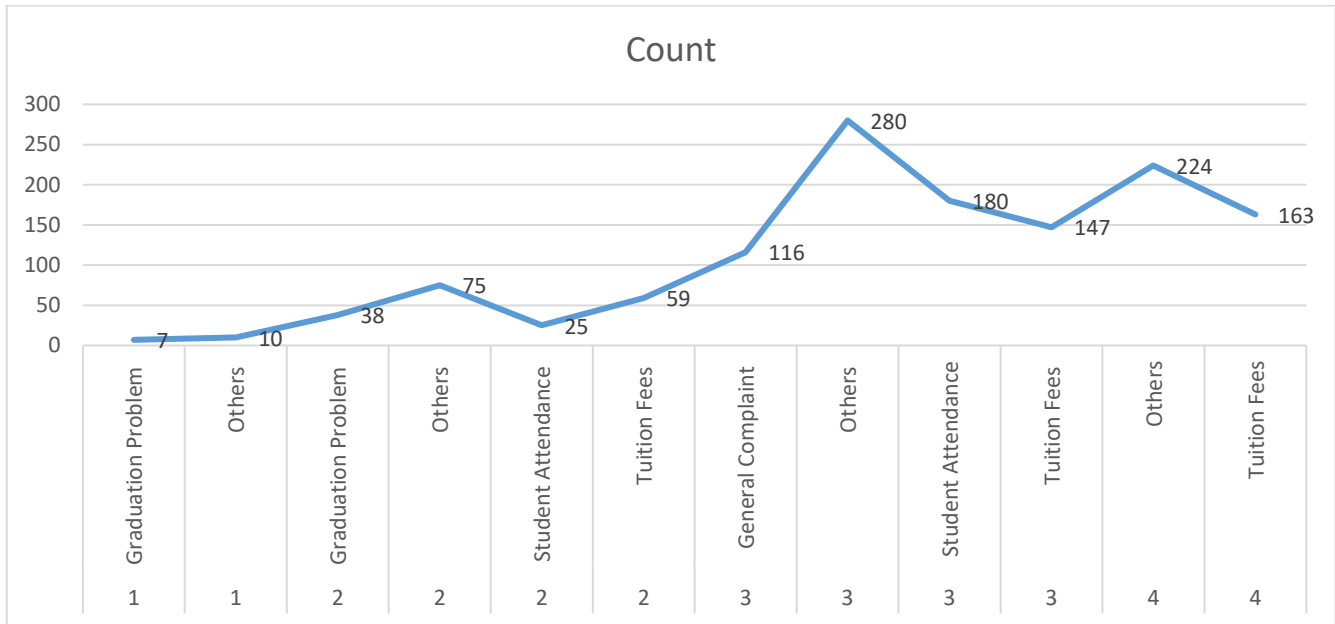


Fig. 4: Total Inquiry/Complaints by type of issue

Furthermore it was found that these issues/complaints are more in certain programme students. In certain degree programmes there were certain types of complaints that were predominating. Like certain complaints like Add/Drop were more in BSID, BSMIS but then Grade issue was more in BSBF and BSID programmes. Using Data Mining, a new knowledge is created that there is a link between the year of study of the student in HEI and the problems/issues faced by them. This knowledge helps in making a lot of corrective actions and strategic decisions that would improve the student’s learning experience and improve the relationship with the university. The departments in which there are specific problems that are high in number can be analysed in the department and college councils to take actions that could reduce the problems. For instance, Add/Drop issues that are high in certain programmes were investigated in depth to solve certain issues related to courses or faculties handling the courses because of which there are lot of add/drop issues/complaints. Furthermore, the tuition fees and grade issues that are affecting a lot of students can be looked at from the administrative and academic perspective to reduce the number of students affected by the issues. Certain strategic decisions can be taken that could help the students. The above decisions can improve effectiveness and efficiency of administrative services. Further it can enhance improvement efforts.

VI. CONCLUSION

Knowledge Management of customer relationship (Student relationship) is the highest superiority of customer service as it helps with long term effects like building student loyalty and value over the generation of the student. By itself, the move to this level of purposeful sophistication in CRM is a strategic modification that has huge ramification in long-standing HEI competitiveness. In spite of it, introduction of knowledge management becomes principal in the strategic plan. There are many details to be considered in taking such a challenging endeavour, i.e. leadership issues, cultural issues, supporting processes, and competency development.

The merger of knowledge management and customer relationship management is undeniably a strategic move, anything less undermines its potential.

DECLARATION

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Ethical Approval and Consent to Participate	No, the article does not require ethical approval and consent to participate with evidence.
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Authors Contributions	I am only the sole author of the article

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