Perceptions from mathematics leader's faculty at a south Texas university in factors that contribute to dropping, fail, and withdrawal rates in college algebra

Marco Antonio Rojo-Gutiérrez[1, a], & Andrés Padilla-Oviedo [b,]

ª Universidad Internacional Iberoamericana, México y, ᵇ South Texas College, Estados Unidos

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Abstract

The math faculty experiences high drop-out, failing, and withdrawal rates in the subject of university algebra. The findings show that higher education institutions can provide better service to students and can maximize their funding to increase graduation rates by eliminating withdrawal and failure rates. In this qualitative research, the faculty of mathematics at a university in southern Texas was asked to share their experiences and perceptions about the factors that contribute to the rates of withdrawal, failure, and withdrawal in university algebra courses. This research provides information for a variety of stakeholders, as it shares the poorly understood perceptions of members of the mathematics faculty regarding how their experience in teaching university algebra influences teacher participation and student support. This research suggests implementing interventions for better teaching and provides strategies to increase approval and retention rates by finding best practices to teach university algebra, as well as serving as a reference for reducing failure and withdrawal rates due to expert recommendation.

Keywords: *college algebra, teaching strategies, mathematics education*

Percepciones de los líderes de la Facultad de Matemáticas en una universidad del sur de Texas sobre factores que contribuyen con la tasa de abandono, reprobación y retiro en Algebra Universitaria

Resumen

La facultad de matemáticas experimenta altas tasas de abandono, reprobación y retiro en la asignatura de álgebra universitaria. Los hallazgos muestran que las instituciones de educación superior pueden brindar un mejor servicio a los estudiantes y pueden maximizar su financiamiento

[1] Contacto: marco.rojo@unini.edu.mx

para aumentar las tasas de graduación al eliminar las tasas de retiro y fracaso. En esta investigación de tipo cualitativa se le solicitó a la facultad de matemáticas en una universidad del sur de texas compartir sus experiencias y percepciones sobre los factores que contribuyen a las tasas de baja, reprobación y retirada en cursos de álgebra universitaria. Esta investigación proporciona información para una variedad de partes interesadas, ya que comparte las percepciones poco conocidas de los miembros de la facultad de matemáticas con respecto a cómo su experiencia en la enseñanza de álgebra universitaria influye en la participación docente y en el apoyo a los estudiantes. Esta investigación sugiere implementar intervenciones para una mejor enseñanza y proporciona estrategias para aumentar las tasas de aprobación y retención al encontrar mejores prácticas para enseñar álgebra universitaria, además de servir como referente para la disminución de las tasas de fracaso y retiro debido a la recomendación de expertos.

Palabras clave: *álgebra universitaria, estrategias de enseñanza, educación matemática*

Percepções de Professores de Líderes de Matemática em uma Universidade do Sul do Texas sobre os Fatores que contribuem para as Taxas de Abandono, Reprovação e Abandono em Álgebra Universitária

Resumo

O corpo docente de matemática experimenta altas taxas de evasão, reprovação e desistência em álgebra universitária. Os resultados mostram que as instituições de ensino superior podem atender melhor aos alunos e podem maximizar seu financiamento para aumentar as taxas de graduação, eliminando as taxas de evasão e reprovação. Nesta pesquisa qualitativa, o corpo docente de matemática de uma universidade do sul do texas foi convidado a compartilhar suas experiências e percepções sobre os fatores que contribuem para a queda, reprovação e taxas de queda em cursos universitários de álgebra. Esta pesquisa fornece informações para uma variedade de partes interessadas, pois compartilha as percepções pouco conhecidas de membros do corpo docente de matemática sobre como sua experiência no ensino de álgebra universitária influencia o envolvimento do professor e o apoio do aluno. Esta pesquisa sugere a implementação de intervenções para um melhor ensino e fornece estratégias para aumentar as taxas de aprovação e retenção, encontrando as melhores práticas para o ensino de álgebra em faculdades, bem como servindo como uma referência para diminuir as taxas de reprovação e desistência devido à recomendação de especialistas.

Palavras-chave: *álgebra universitária, estratégias de ensino, educação matemática*

Introduction

The theoretical basis of this study is Tinto's theory of retention and Johnson and Johnson's theory of cooperative learning. Tinto created a theoretical model that explained the factors that contributed to dropouts (Tinto & Cullen, 1973; Morelli et al., 2021). The factors are social interactions, individual background characteristics, aspirations, and motivations. Self-regulated learning was described as a process to transform mental abilities into academic performance skills by self-directing (Reeves & Stich, 2011; Saeid & Eslaminejad, 2017; Khalid et al., 2020; Malison, 2018; Mahlaba, 2020). The implementation of assigning homework online using MyMathLab enables the students to apply self-regulated learning since

MyMathLab offers examples, guides the students to find the solution, reinforces the concept by giving similar exercises, and gives immediate feedback to the students (Madihie & Mos, 2018; Alotaibi et al., 2017; Morelli et al., 2021).

Cooperative learning was a structured form of small-group problem solving that incorporates differentiation, maintains individual accountability, promotes positive interdependence, instills group processing, and sharpens social skills (Gradel & Edson, 2011; Aljohani, 2016). According to Johnson & Johnson (2008), there are five elements of effective cooperative learning such as positive interdependence; promote interaction, individual and group accountability, interpersonal and small group skills, and group processing. Positive interdependence was described as "We are all in this together" (Gradel & Edson, 2011, p. 194). Promoted interaction is the commitment to help each other learn. Individual and group accountability was divided into individual, interpersonal and small groups, and group processing (Gradel & Edson, 2011; Gordon, 2016).

The benefits of cooperative learning were the collaboration in teamwork, critical thinking, and skills in evaluating, synthesizing, and creating more effective feedback, maximize peer support, and higher student engagement (Durso & Cunha, 2018). Effective cooperative learning strategies used were: systematically implementation, keep groups small, use multiple criteria for building heterogeneous groups, creation of informal, formal, and base groups, and prepared the elements mentioned before (Dohn et al., 2018). Cooperative learning was an intervention used in 1440 College Algebra to enhance student learning and engagement.

Another learning theory that is important for underprepared students is Vygotsky's zone of proximal development. Vygotsky's zone of proximal development says that what a student can do today with assistance, the student will be able to accomplish by himself tomorrow (Tempelman & Pilot, 2011; Chrysikos et al., 2017).

In 1985, Doignon, Falmagne, and associates develop a theory of knowledge representation called Knowledge Space Theory. KST is based on precedence relation. It is evident, particularly in mathematics that some levels of knowledge normally come first to other levels because of precondition requirement, logical steps, or pedagogical easiness. According to Doignon & Falmagne (1985), precedence relation may be used to design effective and efficient assessment mechanics.

There is a problem in a university in southwest Texas. That problem, specifically, is high Drop/Fail/Withdraw (DFW) rates in college algebra. Currently, the Office of Institutional Research and Effectiveness on southwest Texas receives grants to implement interventions for the students who are at risk of failing. However, similar grants have been implemented and the problem persists. This problem impacts graduation rates because that is one of the main factors that contribute to dropout at the university in southwest Texas. Many possible factors are contributing to this problem among which are lack of whole-class discussions, cooperative actives, and relevant application problems (Bonaldo & Pereira, 2016; Hagerty et al., 2010), level of maturity, college readiness, or personal feelings of belonging to college (Barefoot, 2004). This study will contribute to the body of knowledge needed to address this problem by increasing the passing rates in college algebra.

Method

There has been a call in the research literature that seeks inclusion of the voice of former mathematics faculty concerning their perception of that experience and how that teaching experience has influenced positively or negatively passing rates in college algebra (Barnett et al., 2018). The applicable research design for the proposed research was a case study design. The case study is the appropriate mode for naturalistic studies. The case study provides great power for understanding and making predictions about social settings (Dohn et al., 2018). Qualitative research is an effort to understand situations in their uniqueness as a part of a particular context, the analysis strives for depth of understanding (Bernard, 2005; Giannakos et al., 2017). Case study is the study of the particular and complexity and complexity of a single case, coming to understand its activity within important circumstances [and is used in research] to understand its activity within important circumstances (Barnett et al., 2018). This case study examined mathematics faculty perceptions of drop, fail, and withdraws rates in college algebra. The intense thick description provided by interview data from the participants was analyzed for themes (Woods et al., 2018).

Choice of qualitative methodology, particularly naturalistic inquiry, allowed the researcher to not only

interview mathematics faculty who had experience in drop, fail, and withdrawal rates in college algebra, but because the researcher has taught college algebra and experienced drop, fail, withdrawal rates in college algebra, he brings self as an instrument to the research

(Aguilar et al., 2012). The construction of knowledge with informants enhanced the impact of the study, thus making a noteworthy contribution to the research literature (Luque, 2019).

Results

Participants in the study

This naturalistic study included six mathematics faculties including one of who was Asian female, one of who was Hispanic male, and four of who were White males. This demographic information is provided in summary as means of contextualizing the informant descriptions that follow later in this section without providing information that would especially identify each of the informants among this small group since several of the informants were mathematics faculties who had experiences in drop, fail and withdraw rates in college algebra. The six mathematics faculties had experience ranging between six and forty-four years' experience teaching mathematics in higher education.

Findings

Data from the informants as yielded by multiple rounds of coding and analysis have been organized into factors influencing drop, fail, and withdrawal rates in college algebra. Under the primary topic are multiple subtopics and headings that detail out the informant responses and give voice to the Mathematics Faculty.

Factors Influencing Drop, Fail and Withdraw rates in College Algebra

Informant data in this study revealed seven overarching themes related to the factors that influenced students to fail, drop or withdraw in college algebra. These nine themes included: a) interventions (ALEKS/NEWTON/MATH 1440); b) curriculum; c) educational leadership; d) low achievement; e) online education, f) student motivation, and g) technology.

Interventions (ALEKS/NEWTON/MATH 1440)

This theme was presented in six of the interviews. Felix stated that "Well the concept of artificial intelligence, I think will definitely and positively will work for some students, but the thing is I do not know what percentage of students you know the artificial intelligence works

for; it will be interesting to find out that percentage, but we need to define the criteria that are going to help these students be successful in artificial intelligence. In other words, when you advise somebody to take an ALEKS or KNEWTON course, you are going to advise them, this is primarily the emphasis is on artificial intelligence this is going to guide as you go through the course. Almost like we do right now when we have a student why do we enroll a student in remediation as opposed to a college-level course, well we look at certain criteria whether it be ACT scores or THEA or whatever, and then we say well you are not prepared for a college-level course you have to take this course if we can never get to the point that we can identify criteria and also for the student so that we optimize that student learning and we say this type of student I think can try with ALEKS or KNEWTON and those if do not have that criteria they can go to the traditional course but we need to look at that".

Gloria revealed "Definitely, interventions such as ALEKS and KNEWTON should contribute to decreasing drop, fail and withdrawal rates in college algebra, because we have problems with students falling behind on the course and it does not make much sense to teach students to advance material if they do not even know the basics. The idea with ALEKS and KNEWTON, students first have to learn and show that they are proficient with the basics". Alpha mentioned that "with the MATH 1440 if a person can use the extra hour not just for an extra lecture but to encourage students to be successful and to get know other students it can do wonders I think. I know one of my colleagues has been involved and he shares some of the same feelings with me. As far as the software component, I think again use it in conjunction with the instructor to add that extra activity that encourages learning the material and keeping up with the work. People who know how to use it effectively will be a great benefit for the students".

Virgil stated "My observations of ALEKS is that particularly useful for students who are reviewing material that they have already seen but maybe did not retain in a way that will allow them to pass the

placement test, so I think particularly for the remedial math material or the algebra part of college algebra worked pretty well. The students who took it seriously did quite well. Where I think it did not work so well was with material that was new to the students so for many of the students' logarithms were new concepts and they need it a lot more external help, external from the computer program to figure it out. That was the deficiency. I did not see it worked well for material that was new to the students and it worked very well for material that was not new for the students." Remarkably, a mathematics faculty would consider use interventions to increase passing rates in college algebra.

Curriculum

Felix mentioned "I would not be able of those teaching ideas. I learn that the reason one particular way that works but there are several ways and I may not have the way that works for students they may learn from another student. "While Gloria was aware of" This a service department, we have to see what other departments want in our curriculum. We need to look at what kind of students we have coming in from high school, so we will know what to emphasize in our courses and what they do not need".

Virgil was aware of the reality of his students and he stated "Students are busy they have a very busy life. They are not used to do homework and they do not tend to spend a lot of time doing homework. A lot of our initiatives are not focused on that problem. We also tend to lose a lot of students if we make them take too long to complete their math requirements, we lose them from the university entirely so this is a big issue. Overall, I would like to see fewer non-science and engineering students in our college algebra course and I would like to see, students being move to our elementary statistics course or contemporary mathematics course. I think these courses focus more on the issues these students while encounter in their careers and lives, whereas, science and engineering students need college algebra when they encounter calculus. So, I would like to see the level of college algebra increase".

Ralph had been focused on non-STEM majors and he had been trying to make the curriculum meaningful to the students "I been asking questions of all kind of quantitative things. Should a good citizen have a grasp of? How can we help people make important decisions with limited information? Those are the curriculum

issues that are working on." Ann gave special emphasis to "I like to organize things, my class notes, and I know what to do every class period and every chapter".

Educational Leadership

All the respondents had been educational leaders. Felix considered it crucial to study educational trends to stay ahead of what society expects from educators. "I see a lot of faculty who teach the way they were taught and they are thinking as it worked for me it will work for the students and what you do as you are going as a student yourself you learn a little something for every professor you had but then you mold yourself into which of those pieces best work for you, just because it works for that particular person that does not mean it will work for you and then your audience is constantly changing and you have to evolve with your audience you cannot be stuck in your seventies or eighties. We are in 2013 this means that we have to be open to suggestions open to change".

Gloria mentioned "I try to experiment with new things and different educational techniques and I encourage my colleagues to do the same. I suggest and help others to try new things". Virgil said "I think is happening and is a little frightening. I am a leader in our department. I am in charge of some initiatives in remedial mathematics. I am still trying to learn what works for other people and trying to figure out how we will be implementing this at our university".

Ralph stated "To be a leader you need to have followers by definition. If I can be a leader I want to be insightful and innovative and meaningful to my students. Sometimes education leadership, people who end up being the leaders are the ones who run in front of the crowd whatever the crowd happens to be going. That is not my intention. I want to have an impact on education but I will worry more about having an impact on my students as opposed to having some kind of national recognition or some kind of leadership role." Ann considered herself an innovative leader since she was one of the beginners using ALEKS at the university and she had been in charge of other initiatives. Alpha did not want to talk about leadership since he was happier by seeing himself as a worker ant that contributes to society; however, she has previously assistant department chair.

Low Achievement

Felix attributed low student achievement to "At least what I thought is that students have not found the method of studying that best serves, some are visual learners, some are not, some like to read and to commit things to memory there are different ways just like we are talking about presenting material to faculty members; the student also needs to learn what optimizes learning for them and to do what and they came to compare themselves with the neighbor students; they need to find what it works for them and it could be that they need to spend twice as much time as their neighbors or they need to write up things is just the idea of learning what it works for you. I have a student today for instance, who discover something and is something very simple, but she is not an incoming freshman. I place my notes online before I even lecture and she told me that what helps her is going over the notes first before I lecture that she gets more out of it. It is a very simple concept but this when referring to when I am saying it is whatever works for them. It is like having a history class and you are covering chapter 13 next time and you have to read chapter 13 before class that way you get more out of the class instead of just taking notes. That is just a simple example".

Ralph explained "Well, certainly there is a correlation there and that is often a question, there is a body of research. I think someone working at the University of California in Berkley, I think to look at ethnicity and noticed a clear correlation between individual ethnicity and their success rates in math courses, particularly in calculus. So he was able to document that if we know the ethnicity we could predict the grade. ¿So even if we asked the question is that attributable? Is that a cause? Because you are Hispanic is that the cause of you getting lower grades than maybe the Asian students. I think he looks especially at African American students and Asian students. I remember his research, so he went and live in the dorms paid attention to what students were doing, and then he tried to identify things that the successful groups were doing and then tried to build activities that would cause the other groups to those same kinds of things and I believe that was his research".

Virgil mentioned "I see many issues with students retaining the knowledge that they supposed to have gotten in high school. I am not what the real root comes from. I am not educated in that research to know what is missing. Retention is a big issue and even with Calculus sequence and higher courses is always kind of difficult to get students to remember the material of the course later on. I do not know what the real causes are, whether is a question of motivation whether is a question of the techniques that they have been using in high school, or maybe there are just poor testing skills that are part of this. I am not sure". Ann pointed out that absences are the main contributing factor for low student achievement while Gloria said that ethnicity may affect but only because of its relationship with poverty.

Online Education

According to Felix "I think online education works for some people, the online education is for students who are self-discipline, if they are self-discipline, it can work for them it is also a nice venue for certain people. Today we have students who are working, they are caretakers, at home somewhere, and the idea of traveling to an institution for learning becomes a hardship. Technology being what it is is like working at home and that is what they are doing while learning online but again it takes self-discipline. If students do not have self-discipline, they are going to be frustrated because they will never achieve what they are supposed to achieve". Ralph stated "I am still experimenting within myself. It can be very useful for some students, but I do not think it will solve all our problems, At least the drop, failure, and withdrawal rates. It is just a different way to deliver instruction. I am concern so I want to make sure that we are doing it right since it is very easy to do it wrong".

Alpha thought" I think online learning is important. I think students can get a lot from it. If they are students that have the right mindset. I do not think is for everyone but students who are self-motivated and are willing to put in the time it requires. I think it can be very beneficial to them it will allow them opportunities that they do not otherwise have, by the same token some students will never benefit from online learning because they are not self-motivated enough to benefit from it." Virgil stated "I am very positive about online learning; I see great things happening in the area of our statistics courses here at our university. I think in the future, we will have a college algebra course. I think online learning has a big advantage of being a very cost-effective system. I am skeptical that something like a MOOC where you have one instructor with hundreds of students is going to be effective with a significant amount of support from the instructor in the form of a student teaching assistant of some kind. I think there is something for one-on-one interaction, whether the one-on-one interaction is happening online or offline. I think trying to have one and one hundred interactions are not going to work. So, I will say, I am

positive online learning; however, I am skeptical about large online learning courses can be effective but I am open mind. Online homework, I think is a very important facet. I think hybrid courses are probably a wonderful direction. It does not have to be all be online, maybe only part of the course can be online. Again, if we can get the same results for cheaper that is already progress."

Ralph was aware that either we called a course face-to-face, hybrid or online, all of his students are online learners "I think whether we are teaching an online course or not, students are doing online learning. They know how to Google, I am sure that there is someone who does not watch YouTube videos so, in my opinion, online learning is here to stay is part of the culture we live in and we need to be effective, which means we have to do things differently. It is not just to transfer what we are doing face-to-face." Ann stated "I think some are good and some are not, we should distribute a portion of the grade carefully because right now we do one hundred percent in ALEKS in MATH 1334 and if somebody is cheating, he or she can hire someone to do his or her job. It does not make sense but some students do that, so we have to some portion of an online but also a paper test to make sure they did their work. I think students learn a lot because they do their work but we have to do some checkpoint to see if they are doing their job by giving them a paper test."

Student motivation

Felix stated "Parents your immediate family, the extended family you may have an uncle or aunt or cousin that has achieved something in the educational world and you say it can be done. Peers can be either a positive influence or negative influence; if you see your peers doing well you want to keep up with them. The faculty also has the opportunity to motivate students they either take an active party or not. Some faculty feel that they are intrusive but I think is part of the educational process. If the student's response is good otherwise at least you try. In my opinion, a student is surrounded by television, radio, computers, the internet, everything is media-driven so it can either be motivational or not and also like all of these components interact, the family, the media, faculty, peers, the all are contributing factors that student will straight off because they will be more focus on the present satisfaction, they are looking for the satisfaction that is for the now. One day trying of being a student and trying a better life is the idea of thinking in the future but right now when you look at the youth its what is happening now? What is the latest technology in cell phones, music? Is not so much in terms of what am I going to do ten years from now? But that comes with maturity."

Gloria mentioned "Well, I think there several types of student motivation; in the class, the instructor has a strong impact on motivation. If there is a good relationship between student and instructor, that might help students to succeed. Also, for some students is important to get a degree to get a good job. The personality of the instructor also contributes to the motivation of the students." Ralph would like to have an answer but he pointed out "More and more universities and society are marketing to the argument that people with a higher degree get higher pay so get your degree and you get higher pay. I believe that in your lifetime you are going to see more and more people saying somebody gets out there and develops skill and perform over their lifetime what somebody with college gets. I believe you will watch and see. More and more you will see that it will be said that it is a myth. Many people do a very successful life doing air conditioning and everybody cannot be a college professor and everybody will see that there is an issue here. I think as educators and as a society, we need to start re-aligning what it is that works".

Alpha said "Ultimately, is up to them to motivate themselves. We can be the support for them. Like I said it is almost like being a parent. Ultimately it is their desire but you are there to build them up and say what you can say. We are going to help you get there but ultimately is up to them." Ann had been being successful in motivating students by showing them care and interest. She added, "I give them extra credit and you make them happy." Finally, Virgil "My take, I try to make things interesting and try to convince them that is worth learning the material. It depends on the students' background on how to approach that. I often try to connect students' interests; I try to connect with puzzles that students find interesting. I do not always succeed in doing this. I deprived myself because of the areas that I have been researching to connect math with many different areas. I think that is one of my greatest strengths as an instructor."

Technology

According to Felix "Today students are technology-oriented, is a natural educational learning venue for them, they got smartphones, I pad, computers,

everything is technology-driven and now you see six or seven-year-old that is very comfortable with technology so why not use what is comfortable for them. The faculty member who is not open with the idea of technology; I think is shortchanging the whole educational process." Gloria stated "Definitely, usually it can help students directly just like ALEKS and KNEWTON, helping individual students. I think it should help indirectly the instructor since the instructor will have more time to interact with the students instead of grading homework".

Virgil stated "I am kind of divided on this. I think the main news for technology that I see is to try to gain more veins for a bug. It may or may not impact student learning but if it allows us to get the same results for cheaper then maybe that is almost as good so in particular, using ALEKS as a remedial mathematics tool or something similar to ALEKS can allow us to deliver remedial math courses in a much cheaper manner. The same will go with online education initiatives. I think these can allow us to do the same we are doing now for much more cheaply. How is that for more advanced courses, I think is a big question. I think there is not much in trying to teach advanced courses online. I think online homework is an excellent school. It is a way to deliver more homework to the student. The money does not exist to hire someone who grades as much as these programs grade".

Ann suggested "Sometimes they need to think instead of just computing number in the calculator but I think technology impacts learning. I like ALEKS because it gives students immediate feedback when they do the homework and they can continue learning instead of waiting until we grade the paper. I use online homework in face-to-face classes also, because of the immediate feedback." Alpha was aware "it is not using technology what it is important, what it is important is knowing how to use technology effectively. You cannot just give a student a calculator and say work these problems, you rather than create a problem that is going to require that students interact with the technology, not the technology just answer, so if it is done appropriately, it can have a really big impact. You can go far above and beyond where you could go before without technology and that just adds another dimension to the learning process. By the same token if the person does not create problems that will interact with the students then it is a black box in, they are probably learning even less and they are not getting anything from it so yes I believe technology impacts education."

Ralph stated "I believe that technology is changing education. I think there are a lot of examples in that. I think the way students are handling social interaction, huge amounts of information overload, students are getting in one year of information that their grandparents got in their entire life. Education is and what it does is some impact. When I first taught college algebra, we used logarithms for college algebra. You do not find students who know how to do that and even instructors. About the same time when I started teaching one of the first HP calculators came to the market and we stopped using the mechanical ruler to study logarithms. Technology impacts what we teach. As instructors, we need to address the fact that students interact in a different way than they used to do. If we go to a calculus class and students are expected to learn the derivatives but a student shows them wolfram alpha and it is very easy to solve derivatives then they do not need to memorize. Technology facilitates learning. We need to be aware that sometimes technology impacts positively and sometimes negatively".

Conclusions

Results in this study revealed that mathematics faculties who had been familiar with a drop, fail, and withdrawal rates in college algebra feel frustrated were the rates were high and they would like to find a solution to fix the problem. However, this qualitative study of a select small group of mathematics faculties revealed that their participation in drop, fail and withdrawal in college algebra had to do with interventions (ALEKS, KNEWTON, and MATH 1440), curriculum, educational leadership, low achievement, online education, student motivation, and technology.

These research projects began in search of acknowledging the mathematics faculty voice, of drop, fail, and withdrawal rates in college algebra participants because research has predominantly been only quantitative. For mathematics faculty who are debating on possible factors in drop, fail and withdrawal rates in college algebra, a naturalistic, the goal was that a qualitative study would provide additional information about making educational choices from participants who had experienced interventions (ALEKS, KNEWTON and MATH 1440), curriculum, educational leadership, low

achievement, online education, student motivation and technology in college algebra

Mathematics faculty, much like faculty, seek advice about their choices by asking other mathematics faculty and students about what factors contribute to drop, fail, and withdrawal rates in college algebra. This study provides an overview for such mathematics faculties and may help answer questions about how to increase passing rates in college algebra. Mathematics faculty and educational leaders may look at quantitative studies, especially for the factors that contribute to

dropping, fail and withdrawal rates in college algebra, but information from participants themselves provides a unique look into what to expect from students who take college algebra as well as strategies that had been successful to improve student success in college algebra. As a result of this study, mathematics faculty, educational leaders, students, and parents, are expected to benefit and be better prepared to make informed choices regarding their teaching effectiveness in college algebra.

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