# Subject content knowledge for the in field assessment education essay

Education

In 2002, teacherabrasion rates and keeping jobs ( Ingersoll, 2002 ) compounded the issue of out-of-field instructors, increasing the strain of run intoing the demands of puting a extremely qualified instructor in every schoolroom ( NCLB, 2001 ) . In President Bush 's 2006 State of the Union Address he pledged to make an extra 30, 000 newmathematicsand scientific discipline instructors to rectify for these deficits ( Bush, 2006 ) . Interestingly, in 2009 Ingersoll concluded that the instructor deficits were no longer the taking cause of the deficiency of high quality instructors but instead it was due to permeant school staffing and direction jobs. A

Teacher deficits are still a major, nevertheless ; several research surveies have found that `` extremely qualified '' instructor shortages has become an even greater concern ( Blank, Langesen, Laird, DeMello, 2003 ; National Academy of Sciences, 2007 ; National Center forEducationStatistics, 1997 ; Ingersoll, 2002 ; Rumberger, 1987 ; U. S. Department of Education, 2009 ) . Drum sanders ( 2004 ) concluded that 57 % of in-between school pupils were taught by a instructor who had non earned adequate college credits to declare a minor country of survey in a related field ; , 48 % of in-between school physical scientific discipline pupils were taught by a instructor missing a child in a related field. More late, a survey by Schools and Trust ( 2008 ) found that teacher mis-assignments totaled 27 % of the nucleus classs in the state 's high-povertyschools. Mis-assignment is the assignment of a certified instructor to learn in a content country that he or she does non hold an indorsement or major, and therefore has deficient content command. Alternatively, these instructors may be considered partly out-of field. Out-of-field assignments are still rather common. In each of the six old ages of

informations aggregation, Donaldson and Johnson ( 2010 ) found that anyplace from 57 % to 74 % of math instructors, 16 % to 31 % of societal surveies instructors, and 38 % to 48 % of scientific discipline instructors lacked a major in the field they were learning. Out-of-field assignments were most prevailing in the first one or two old ages of respondents ' callings ( Donaldson & A ; Johnson, 2010 ) .

Despite a extremely qualified position, if a instructor is mis-assigned or learning wholly out-of-field they are missing the necessary preparation and cognition needed to decently turn to the demands of the pupils. Filling the schoolroom with quality instructors remains a primary concern within the educational system. Having extremely qualified instructors with cognition and background in their content countries and strong supervising from content leaders and decision makers is critical to the success of their pupils ( Garner, 2007 ) .

The National Council for Accreditation of Teacher Education has claimed that teacher quality represents `` the parallel development of learning cognition that is specific to the content being taught, every bit good as general pedagogical cognition '' ( Hattie, 2008 ) . This research survey examined the differences in instructor quality when instructors are outside their primary field of survey. This step of instructor quality represents a contemplation of a instructor 's capable content cognition ( SCK ) and pedagogical content cognition ( PCK ) . The two cognition spheres of each instructor were measured both in math ( in-field tonss ) and in scientific discipline ( out-of-field tonss ) .

Hill, Rowan, and Ball ( 2005 ) found that instructors ' mathematical cognition was significantly related to student achievement additions. Furthermore, there are several surveies that indicate instructors that have a grade majoring in mathematics are strongly associated with higher pupil accomplishment in high school and in-between school ( Aaronson, Barrow, & A ; Sanders, 2007 ; Frome, Lasater, & A ; Cooney, 2005: Goldhaber & A ; Brewer, 2000: Monk, 1994 ; Wenglinsky, 2000, 2002 ) . It has besides been shown that teacher subject-area enfranchisement is systematically and strongly associated with high school and in-between school pupil accomplishment ( Cavalluzzo, 2004 ; Goldhaber & A ; Brewer, 2000 ) .

Several research surveies exist, sing either teacher effectivity, teacher quality, or pupil accomplishment, each of which step in some signifier or another both pedagogical content cognition and capable content cognition of the instructors ( Hauk, Jackson, & A ; Noblet, 2010 ; Saderholm, A Ronau, Brown, & A ; Collins, 2010 ) . Similarly, in this survey the research worker measured the capable content cognition and the pedagogical content cognition of instructors as the finding step of instructor quality. Specifically, in-between school mathematics instructors ' capable content cognition and pedagogical content cognition in mathematics were compared to their capable content cognition and pedagogical content cognition in physical scientific discipline.

In this survey 21 in-between school mathematics instructors were given theDiagnosticTeacher Assessment of Mathematics andScience( DTAMS ) Instrument for both mathematics ( Algebraic Ideas Assessment ) and Science

( Physical Science Assessment ) . The DTAMS instrument has been shown to be both a valid and dependable study designed to mensurate Capable Content Knowledge and Pedagogical Content Knowledge in math and scientific discipline ( Brown, McGatha, & A ; Karp, 2006 ) .

Both Subject Content Knowledge and Pedagogical Content Knowledge have been used to mensurate teacher effectivity and finally a step of instructor quality ( Ball, Thames, & A ; Phelps, 2008 ; Hill, Ball, & A ; Schilling ; 2008 ; Manizade, 2007 ) . Once both Subject Content Knowledge and Pedagogical Content Knowledge tonss are established they were combined to organize a step for teacher quality. This was done for both in-field tonss and out-of-field tonss. After which the instructor quality tonss for both in-field and out-of-field were straight compared to bespeak the grade to which a instructor either additions or losingss quality.

This research survey addresses the inquiry: What is the difference in quality of an in-field instructor compared to an out-of-field instructor - specifically in math as the in-field and scientific discipline as the out-of-field content country?

Two features that continue to come up when reexamining surveies affecting instructor effectivity are the instructors ' natural cognition of the capable affair and their ability to transform that cognition into an prosecuting lesson for pupils. These properties of instructor effectivity are more normally referred to as capable content cognition and pedagogical content cognition. This survey may offer a more direct comparing of a instructor 's ability to utilize these traits outside their primary field of survey. The results of this

survey may turn out to be important to the professional development community at big. Furthermore, the consequences of this survey may congratulate an of import research undertaking, titled `` Measures of Effective Teaching '' ( MET ) , sponsored by the Bill and Melinda Gates Foundation. Developed by research workers at Educational Testing Service ( ETS ) and the University of Michigan, the MET is designed to mensurate non-traditional facets of cognition particular to instruction.

The research worker administered both the mathematics part ( Algebraic Ideas ) and the scientific discipline part ( Physical Science ) of the DTAMS study, designed to mensurate both the pedagogical content cognition every bit good as capable content cognition, to attest in-between school mathematics instructors. The studies were so scored by the University of Louisville Center for Research in Mathematics and Science Teacher Development ( CRMSTD ) staff. The tonss from the mathematics part of the DTAMS were used as the baseline tonss and referred to as the in-field tonss. The tonss from the scientific discipline part of the DTAMS were referred to as the out-of-field tonss. The grade to which the in-field tonss differ from the out-of-field tonss indicated the expected alteration in a instructor 's cognition domains when learning outside her primary field of survey.

One of the primary restrictions of this survey stemmed from the size of the population. The appraisal in this survey was based on self-reported responses ; nevertheless, it is expected that since the participants are professionals their responses were echt. The population size is restricted for two grounds. First, each participant was expected to finish two studies that

took about one hr each. This was a clip devouring undertaking, and it was hard to happen adequate in-between school math instructors that were willing to take part. Second, each study cost the research worker 10 dollars to be evaluated by the trained scorers from The University of Louisville Center for Research in Mathematics and Science Teacher Development. It should be noted that the participants were purely voluntary and were non compensated. Using trained scorers was necessary to guarantee the cogency and dependability of the studies.

## Problem Background

It was reported that in 2000, 23 % of public in-between school pupils and 10 % of public high school pupils received their instruction in mathematics by instructors without a major or enfranchisement in math instruction. These Numberss are somewhat greater when looking at private schools ( Seastrom, Gruber, Henke, McGrath, & A ; Cohen, 2002 ) . Donaldson and Johnson ( 2010 ) found the Numberss to be more disturbing. With six old ages of informations aggregation, Donaldson and Johnson found that anyplace from 57 % to 74 % of math instructors, 16 % to 31 % of societal surveies instructors, and 38 % to 48 % of scientific discipline instructors lacked a major in the field they were learning.

With new statistical and analytical methods used by a broad scope of research workers, grounds has been mounting that teacher quality can account for a big portion of discrepancy in student trial tonss ( Boyd, Lankford, Loeb, Rockoff, & A ; Wyckoff, 2008 ; Ferguson, 1991 ; Hanushek, 1996 ; Hanushek, Kain, & A ; Rivkin, 2009 ; Rockoff, 2004 ) . Quality

instructors are indispensable to the success of any school plan. The two most of import properties of a quality instructor is their capable content cognition and their pedagogical content cognition ( Even, 1993 ; Hill, Rowan, & A ; Ball, 2005 ; Ma, 1999 ; RAND, 2003 ) .

Teachers who have met the demanding criterions of National Board Certification and those who have generated higher `` value-added '' pupil accomplishment additions are far less likely to learn economically disadvantaged and minority pupils ( Cavalluzzo, 2004 ; Goldhaber & A ; Anthony, 2004 ; Humphrey, Koppich, & A ; Hough, 2005 ; Sanders & A ; Rivers, 1996 ) . As a consequence, high-poverty schools are more likely to be beset with learning vacancies in math and particular instruction, and much more likely to staff schoolrooms with out-of-field, inexperient and less-prepared instructors. ( Ingersoll, 2002 ; Mayer, Mullens, & A ; Moore, 2002 ; Strizek, Pittsonberger, Riordan, Lyter, & A ; Orlofsky, 2006 ) .

The pattern of engaging instructors to learn topics that they are non qualified for is good documented and a serious hurt to the territories, the instructors and most significantly the success of the pupils. This is particularly true in high minority and high poorness countries. The dearth in the literature occurs when trying to quantify the grade to which an out-of-field instructor differs in abilities and strengths to instructors that remain within their primary field of survey.

A few more recent surveies have shown that a decently certified instructor who is learning in their specific field of survey contributes greatly to the success of their pupils. Out-of-field instructors are significantly less

successful in increasing pupil accomplishment ( Board of Regents, 2008 ) . Research has besides systematically and clearly pointed out that effectual instruction is a extremely important factor impacting pupil accomplishment ( Babu & A ; Mendro, 2003 ; Hanushek, Kain, & A ; Rivkin, 2009 ) . Furthermore when it comes to effectual instruction, research has found that teacher experience and capable content cognition has systematically shown important impact on pupil accomplishment ( Gordon, Kane, & A ; Staiger, 2006 ; A Rice, 2003 ; Hanushek, Kain, & A ; Rivkin, 2009 ; Rockoff, May 2004 ) . Effective instruction implies instructors have well-developed pedagogical content cognition, yet this cognition develops over clip ( Ball, Lubienski, & A ; Mewborn, 2001 ; Grossman, 1990 ) .

A turning figure of research surveies are trying to flesh out a relationship between capable content cognition and pedagogical content cognition ( Ball, 1990 ; Ball, Hill & A ; Schilling, 2004 ; Ball, Thames, & A ; Phelps, 2008 ; Hill, Ball, & A ; Schilling, 2008 ; Ma, 1999 ; Manizade, 2007 ; Shulman, 1986 ; Thornton, 2004 ; Wilson, Shulman & A ; Richert, 1987 ) .

Shin, Koehler, Mishra, Schmidt, Baran, and Thompson ( 2009 ) demonstrated thatA the degree of pedagogical content cognition of a instructor contributes significantly toward effectual instruction and pupil public presentation. Furthermore, there have been an increased figure of research surveies trying to operationalize the step of instructor 's pedagogical content cognition by manner of a paper pencil system or online study ( Ball, 2003 ; Kromrey & A ; Renfrow, 1991 ; Shin et al. , 2009 ) .

Saderholm, A Ronau, Brown, and Collins ( 2010 ) have late contributed to the hunt for instructor quality by formalizing the Diagnostic Teacher Assessment in Mathematics and Science ( DTAMS ) mathematics appraisals for middle-school instructors. The dependability and cogency of the DTAMS appraisals were ab initio established by using adept inquiry composing squads and referees every bit good as reexamining national criterions for content. A DTAMS measures both capable content cognition and pedagogical content cognition in several math and scientific discipline subjects. These subjects are straight related to teacher quality and pupil accomplishment.

There were two distinguishable ( DTAMS ) appraisals that were utilized in this survey. The in-field ( mathematics ) DTAMS Algebraic Ideas appraisal measuredA memorized cognition, conceptual apprehension, higher-order thought, and pedagogical content cognition. The out-of-field ( scientific discipline ) Physical Science appraisal measured declaratory cognition, scientific enquiry and processs, conventional cognition, pedagogical content cognition, and scientific discipline, engineering, and society cognition ( Brown, McGatha, & A ; Karp, 2006 ) .

## Purpose of the Study

This survey was designed to mensurate the alteration in a instructor 's capable and pedagogical properties if they were to learn outside of her field of survey. By understanding the grade to which a instructor 's cognition spheres change when learning merely outside of their primary field of survey, pedagogues and decision makers would hold a more clear apprehension as to the effects an out-of-field instructor may hold on his or

her pupils. More specifically, this survey focused in on two closely related Fieldss, mathematics and physical scientific discipline. This offers an exceeding penetration as to the alone differences in both capable content and pedagogical content cognition that an out-of-field instructor would hold in the instruction of pupils. These differences could function as a pace stick for disposal and policy shapers as they consider the issue of engaging out-of-field instructors and ultimate success orfailureof their pupils and schools.

It has been good established that non merely is the quality of the instructor the individual most of import schooling factor foretelling pupil results ( Ferguson 1998 ; Goldhaber 2002 ; Goldhaber, 1999 ; Hanushek, 1999 ) , but that `` the quality of a instructor can do the difference of a full twelvemonth 's acquisition growing '' ( Hanushek, 1992, p. 8 ) . Furthermore, many research workers and pedagogues agree that a combination of both capable content cognition and pedagogical content cognition are the primary properties of a quality instructor ( Ball & A ; Bass, 2000 ; Ma, 1999 ; Rowland, Martyn, Barber & A ; Heal, 2000 ; Shulman 1986, 1987, 1996 ) .

## Research Questions

This research is designed to reply several inquiries. First, how much capable content cognition is gained or lost when a in-between school mathematics teacher Teachs outside his/her field in physical scientific discipline?

H1: In-between school instructors certified to learn mathematics will demo a lessening in capable content cognition when they teach outside of their field, physical scientific discipline.

H1a: In-between school instructors certified to learn mathematics will demo no important alteration in capable content cognition when they teach outside of their field, physical scientific discipline.

H1b: In-between school instructors certified to learn mathematics will demo an addition in capable content cognition when they teach outside of their field, physical scientific discipline.

The other of import yet distinguishable cognition sphere that must be considered is the pedagogical content cognition of the instructor. This was done by replying the inquiry, how much pedagogical content cognition is gained or lost when a in-between school mathematics teacher Teachs outside his/her field in physical scientific discipline?

H2: In-between school instructors certified to learn mathematics will demo a lessening in pedagogical content cognition when they teach outside of their field, physical scientific discipline.

H2a: In-between school instructors certified to learn mathematics will demo no important alteration in pedagogical content cognition when they teach outside of their field, physical scientific discipline.

H2b: In-between school instructors certified to learn mathematics will demo an addition in pedagogical content cognition when they teach outside of their field, physical scientific discipline.

Finally, the last set of inquiries combines the measurings for both topic and pedagogical content cognition to find an overall consequence on instructor

quality. By sing both cognition domains as equal subscribers to the overall step of a teacher quality we can find the general consequence ( addition or lessening ) that in-between school mathematics instructors who teach outside of the field ( physical scientific discipline ) may see. What is the overall consequence on instructor quality when a in-between school mathematics teacher Teachs outside his/her field in physical scientific discipline?

H3: The overall quality of in-between school instructors certified to learn mathematics will diminish when they teach outside of their field, physical scientific discipline.

H3a: The overall quality of in-between school instructors certified to learn mathematics will demo no important alteration when they teach outside of their field, physical scientific discipline.

H3b: The overall quality of in-between school instructors certified to learn mathematics will increase when they teach outside of their field, physical scientific discipline.

## Restrictions and Boundary lines

The population used in this survey was its primary restriction. The sample of participants included 21 instructors that were certified to learn in-between school mathematics in Illinois. The research worker administered both the Algebraic Ideas Survey ( DTAMS ) and the Physical Science Survey ( DTAMS ) . Each study took approximately 60 proceedingss to finish. A committedness of two hours of the participants ' clip was a big petition ; this

limited the figure of participants willing to react to this survey. The studies were so sent to the University of Louisville Center for Research in Mathematics and Science Teacher Development ( CRMSTD ) for analysis by the research worker of this survey. The analysis included a comparing of both capable content cognition and pedagogical content cognition of the instructors for both in-field ( mathematics ) and out-of-field ( physical scientific discipline ) . The consequences of this comparing addressed straight the research inquiries found in this survey.

Distinct advantages and disadvantages occur that are declarative of a descriptive research design. This survey specifically targets the relationship between in-field tonss and out-of-field tonss doing a correlational analysis an appropriate foundation. A correlational analysis lent itself of course in seeking relationships between capable content cognition, pedagogical content cognition and among the related demographics. However, no affair how important the correlativity, causing can non be inferred due to possible influence of unbridled immaterial variables.

Several statistical methods were implemented so as to counter the influence certain specific variables may hold on the consequences of this survey. These variables include age, experience, educational history, and socio-economic workenvironment.

Finally, it is of import to observe that respondents were non given the chance for elucidation of study inquiries nor did they have an chance to explicate their reading of the inquiry. Misconstrued inquiries frequently times led to an inappropriate response when in fact the participant may really good

hold a clear and strong apprehension of the topic or variable features being measured.

## Definition of Footings

In this research survey, it is peculiarly of import to explicitly specify any cardinal footings. In the undermentioned subdivision the primary key footings are defined.

## Capable Content Knowledge for the Out-of-Field Assessment

Declarative Knowledge: A This cognition is entirely based on facts and definitions. Teachers with this cognition have the accomplishments to execute rote algorithmic undertakings that are indispensable to work outing jobs. The ability to remember facts, regulations, scientific Torahs and definitions is a important constituent in instruction ( Brown, McGatha, & A ; Karp, 2006 ) .

Scientific Inquiry and Procedures: A Scientific processs and attacks represent the cognition type that allows for the ability to acknowledge the elements of scientific enquiry such as placing inquiries for scientific enquiry, design and behavior scientific probes and experiments, use appropriate informations aggregation and analysis techniques, the ability to believe critically about the informations and to do logical decisions and accounts ( Brown, McGatha, & A ; Karp, 2006 ) .

Conventional Knowledge: A Schematic cognition represents a more in-depth apprehension of the nature of scientific constructs, rules and related phenomenon. Teachers with this cognition can efficaciously compare and

contrast assorted scientific belongingss and features and can explicate bounds and the development of current scientific cognition ( Brown, McGatha, & A ; Karp, 2006 ) .

Science, Technology, and Society Knowledge ( STS ) : This cognition allows instructors to bridge the spread between the scientific community and its influences on society as a whole. Teachers were able to show a thorough apprehension of the function that human demands play in the development and application of scientific discipline every bit good as a historical and planetary position of how scientific finds have impacted society. It is the nature by which scientific discipline, engineering, society, and current environments interact and germinate as a individual entity ( Brown, McGatha, & A ; Karp, 2006 ) .

## Capable Content Knowledge for the In-Field Assessment

Memorized Cognition: This is most closely related to the antecedently mentioned declaratory cognition in the old appraisal. This is cognition that is based upon using the accomplishments and algorithms necessary for accurate calculation. This is non conceptual by nature nor is it a step of job work outing abilities. Teachers with this cognition can execute calculations affecting assorted algorithms, definitions, and a remembrance of facts ( DTAMS, 2006 ) .

Conceptual Understanding: This cognition corresponds most closely to Schematic Knowledge for the scientific discipline appraisal, wherein it represents the knowing and understanding why. Teachers with this cognition have the ability to do connexions between mathematical subjects and to see

the general relationship that unambiguously binds these subjects into cosmopolitan constructs ( Brown, McGatha, & A ; Karp, 2006 ) .

Problem Solving and Reasoning: This cognition represents the tactical cognition needed to infer what is of import mathematical information in non-standard math jobs, and cognize how and why one can use different mathematical attacks to happen solutions to an array of applications ( Brown, McGatha, & A ; Karp, 2006 ) .

## Pedagogical Content Knowledge

Pedagogical Content Knowledge: Lee Shulman coined the phrase `` pedagogical content cognition '' in 1985 and possibly specify it best in his ain words ( Shulman, 1987, p. 13 ) :

[ Pedagogical Content Knowledge is the ability to ] elucidate capable affair in new ways, reorganize and divider it, clothe it in activities and emotions, in metaphors and exercisings, and in illustrations and presentations, so that it can be grasped by pupils.

Additionally, pedagogical content cognition `` represents a category of cognition that is cardinal to instructors ' work and that would non typically be held by non-teaching capable affair experts or by instructors who know little of that topic '' ( Marks, 1990, p. 9 ) .

For this survey the term Pedagogical Content Knowledge most closely reflected the following definition from the Diagnostic Teacher Assessment in Mathematics and Science: This cognition represents strategic cognition for mathematics teaching- '' cognizing when, where, and how to outdo Teach

mathematics '' ( Brown, McGatha, & A ; Karp, 2006, p. 1 ) . Once once more these appraisals concentrated on the usage of pedagogical content cognition in the rectification of pupil misconceptions about mathematics. Teachers with this cognition can fulfill two standards: acknowledge the pupils ' misconceptions, and depict the most effectual ways to learn peculiar mathematical constructs utilizing the most powerful analogies, illustrations, illustrations, accounts, experiments, and presentations.

## Middle School Teachers

For the intents of this survey in-between school instructor is defined as any instructor certified to learn 6th, 7th, and 8th class.

## Significance of the Study

Teachers in high poorness, high minority schools are more likely to be less experient, less educated, learning on exigency licenses or releases, and learning topics for which they are non qualified ( Carroll, Reichardt & A ; Guarino, 2000 ; Darling-Hammond, 2002 ; Goe, 2002 ; Hanushek, Kain, O'Brien, & A ; Rivkin, 2005 ; Ingersoll, 2002 ; Lankford, Loeb, & A ; Wyckoff, 2002 ; Marvel, Lyter, Peltola, Strizek, & A ; Morton, 2007 ; Peske & A ; Haycock, 2006 ; Scafidi, Sjoquist, & A ; Stinebrickner, 2007 ; Useem & A ; Farly, 2004 ) . Mathematicss and scientific discipline, in peculiar, are typically targeted as Fieldss most enduring from deficits ( Grissmer & A ; Kirby, 1992, 1997 ; Liu & A ; Ramsey, 2008 ; Murnane et al. , 1991 ; National Commission on Mathematics and Science Teaching, 2000 ; Weiss & A ; Boyd, 1990 ) . In fact, legion high-profile studies from organisations including the National Academy of Sciences ( 2006 ) , the National Research Council ( 2002 ) , and

the US Department of Education ( 2002 ) have straight tied mathematics and scientific discipline instructor deficits to the quality of educational public presentation and, in bend, to the future wellbeing of the economic system and the security of the state.

Although many in-between school decision makers may experience it necessary to use instructors in countries for which they are under-qualified, this survey may bespeak the hazards to student accomplishment based on an out-of-field policy. Research has systematically pointed to effectual instruction as the most important factor impacting pupil accomplishment ( Babu & A ; Mendro, 2003 ; Manizade, 2007 ; Rivkin, Hanushek, & A ; Kain, 2005 ) . This survey is important to foster the apprehension of the benefits and/or hazards of utilizing out-of-field instructors in a in-between school scientific discipline category.

Repeating the educational demand for quality instructors, the research community including the Research and Development ( RAND ) Mathematics Study Panel of 2003 had called for increasing criterions for teacher readying plans ( RAND, 2003 ) .

This survey would offer some penetration as to the direct and distinguishable difference in instructor quality when sing a arrangement of an out-of-field instructor into a schoolroom that they are non to the full prepared to learn.

## Decision

Additions in pupil accomplishment are, more frequently than non, accredited to the quality of the instructor. Loopholes in the hiring patterns of quality

instructors have led to an addition in out-of-field instructors in the schoolroom. In chapter 1 it was stated that research workers normally view teacher quality as a combination of both capable content cognition and pedagogical content cognition. The intent of this research was to mensurate the difference in teacher quality between in-field and out-of-field instructors. The consequences of this survey are important in that it contributes to the broader apprehension of how out-of-field instructor impact instruction.

Chapter one is an overview of the research that was performed ; an debut to the background of the job, intent of the survey, research inquiries with hypotheses, definition of cardinal footings, restrictions of the survey, and the importance of the survey. In the undermentioned chapters, there is a reappraisal of the relevant research related to this survey, an account of the methods employed, informations analysis with an account of the consequences, and a treatment of how the consequences could be applied.