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Digital Divide among the Faculty of a State Educational Institution

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Abstract - This research aimed to determine the 'digital divide' among Faculty Members of Carlos Hilado Memorial State College for academic year 2007-2008 in order to gather baseline information for a Proposed Development and Intervention Program. The study made use of the descriptive research, employing the analysis of the responses of the faculty members to the different items raised in the questionnaire. The faculty members are on the poor side of the digital divide due to limited access to computers, internet, and multimedia. The level of ICT skill is average although they have shown some skills. The faculty's ICT capability must be enhanced.

Keywords - Digital divide, faculty, state educational institution

INTRODUCTION

Technology changed the world a lot, and it helped society take a large step into the future. It has affected lives in many ways. Anywhere in the world, technology is built and people are expected to adapt with it and live with it. Without technology, the world would be a harder place to live in. Without it, the world would be a dull and primitive place.

In education, the thrill of using technology is even more compelling. It revolutionalizes education – its curriculum, its format, its delivery. There is a heeding call for a pedagogical shift among teachers in terms of quality professional development. And the issue of 'digital divide' among teachers is perceived as an impediment to this required significant reform in education.

There are many things that are done differently in schools now and that go for all age groups. Today marks the time in history that children are outpacing and overtaking adults on the technology track. Technology is what makes students of 2007's education different from the education of students of 1955. With this, educators need to rethink the teaching and learning process to take full advantage of all these technologies have to offer. The general potential of technology to improve education is enormous. Hypermedia, simulations and other application of empowering technology are evolving and becoming a natural part of education. With new technologies, (particularly the computers and the Internet), learning evolved into a new prism of space, time, channels and materials.

Accordingly, the schools need to move to a more interactive delivery model. Learning must be customized, student-centered, and non-linear, with teachers acting as motivators and facilitators of learning rather than transmitters of information. Without abandoning the traditional methods and strategies, they are challenged to mix or blend them with the new and emerging technologies in the form of multimedia presentations, CDROMs, and web-based delivery among others. Likewise, they are encouraged to utilize new communication channels, systems and gadgets to interact with their students through email, SMS, chatrooms and tele/video conferencing, multi-media distance teaching, and others. On that account, teachers need to

know how to infuse technology into their everyday curriculum more than using particular software. They also need ongoing support and mentoring from instructional leaders.

Definitely, this is a daunting task whereby successful integration of classroom technology is necessitated and changes of huge magnitude in educational philosophy, classroom management, and curricular goals are regarded to be essential. This advocates more research on technology use, more professional development for teachers in the area of technology infusion, and radical shifts in pedagogical methods and philosophies.

Along with this, there are probing questions that account for this 'digital divide' – Are the teachers ready to embrace new technology in instructional delivery? Does every teacher have fair and easy access for utilization and ownership of these technologies? Or do they have the necessary skills in utilizing the said technology?

Carlos Hilado Memorial State College has joined the race towards modernization. It has been resorting to the so-called "capability building" in terms of ICT acquisition. Likewise, it has been receiving support from CHED and congressional district in the form of instructional technologies (i.e. computers) donation. To this effect, many teachers have notably shifted from the traditional materials into the computerized process of the preparation of course syllabi, hand-outs, test papers and even computation of grades. Some employed the services of multimedia presentations to deliver lectures electronically. With these manifestations, teachers are purposely or unknowingly mix traditional methods with technology driven ones.

Nevertheless, there is no attempt to determine how many have started utilizing the available technology, and how many are reluctant to do it. There is no way to know the causes of inappropriate utilization of the technology, and the factors or reasons why there are still faculty members who refuse to use these available technologies. The extent of digital divide existing among teachers and the circumstances or conditions surrounding it is not explicitly known.

OBJECTIVES OF THE STUDY

This research is conducted as a pilot study to describe the technologies available at CHMSC which constitute 'digital divide' among its faculty members who are responsible in producing information-literate and information-capable citizens. Narrowing the focus, this study would determine the 'digital divide' among faculty members CHMSC Faculty Members and further identify the characteristics affecting this difference. It will likewise provide a clearer representation of CHMSC faculty members' skills and capabilities in using technology-based delivery systems for instructional purposes. The output of this paper would lead to the formulation of a proposed intervention program that advocates extensive and proper education, training and exposure to ICT which is necessary to develop human resources who are responsible and able to benefit from ICT. The empirical data gathered from this study will also afford state universities and colleges to develop strategies, build and implement training and development programs appropriate and viable to its current and future ICT capabilities.

FRAMEWORK

Today's blinding pace of technology developments has affected every aspect of man's lives, be it social, economic, or political (Nilo, 1997). Advances in information and communication technology has paved the way to new modes of organizing and doing work (Villaluz and Khanser, 2001). It is now redefining the way people live. With innovation, cheaper technology and a more liberalized regulatory environment, technology now has the potential to improve lives in developing countries like ours. Hence, its impact on society and its environment is a current theme that is discussed from local to international fora all over the world.

Major transformations in the global political economy have ushered in what is commonly thought of as information and communication technology-led revolution (Rye, 2001). This causes endless effort among professionals who have to join the 'rat-race' if they want to keep abreast of the state-of-the-art technologies and keep their skills

relevant and in a high demand that will command competitiveness. In particular, issues of inequalities of access, skills, and utilization to both technology and information have begun to prompt concern about emerging 'digital divides' between and among people. If individuals or groups of individuals are excluded from using ICT, it is argued, then they will be excluded from many of the benefits that ICT can bring. However, as Wills (1999) reasoned:

"The very technology that has the power to empower us all also has the potential to increase the problems of social exclusion unless we act to bridge the digital divide ..."

From this background, the term 'digital divide' is now conceptualized in a more sophisticated manner. As the US Department of Commerce (2000) recently outlined, these divisions are portrayed in simple and stark terms:

"Some individuals have the most powerful computers, the best telephone service and fastest Internet service, as well as a wealth of content and training relevant to their lives … Another group of people don't have access to the newest and best computers, the most reliable telephone service or the fastest or most convenient Internet services. The difference between these two groups is … the Digital Divide".

The concept has been widely used and its existence has had solid empirical backup (Reddick, 2000) Moreover, the digital divide, as Fong, et. al. puts it, is not just an economic or a political debating game. The pace of technology absorption has also created an environment that imposes pressure on academic institutions. Schools have been tempered by concerns over potentially divisive aspects of the information age.

The emergence and evolvement of 'digital divide' has made education become more complex, costly and coveted (Newsweek, 1991). To this effect, rich and advanced nations provide for it an elaborate array of institutions. They spend nearly as much on education in order to eliminate this gap as on defense or health. Technologies, computers, and the Internet become the bywords and regarded as viable means of enhancing the competitive edge of a university. Fergusson and Wilson (2001) revealed this in their study and further emphasized that "common response to this situation is to develop an on-line presence in an effort to be part of the global market." Educational systems

everywhere are putting premium on ICT use, access and utilization. Universities and colleges both public and private are merely responding to the demands of the market. In order to survive and stay ahead in an increasingly competitive international market environment, brought about by globalization, education is being restructured, re-engineered and re-invented so rapidly, Salgado (2000) explains. Now, more than ever, schools must formulate workable plan and strategy to maximize the use of ICTs in instruction that would bridge 'digital divide' and bring about improved teachers' and students' performance.

In the Philippines, the higher education system is a key player in developing the country's human resource in the context of globalization and the emerging knowledge-based economy. One of the major thrusts of the 2001-2004 Medium-Term Education Development Plan (MTEDP) for Basic Education is to "enhance school learning environment and minimize the 'digital divide' by encouraging wider ICT use in schools to support the teaching-learning process. The program between DTI and DepEd in providing computer laboratories was perpetuated to this effect. Moreover, major initiatives were rendered along the establishment of a cross-sector support system for the use of ICT, complementary resource development, and advocacy for the utilization and dissemination of ICT; and development of evaluative studies and researches on establishing national core competencies and on impact of ICT-driven curricula on student learning and academic performance for ICT. Republic Act 7722 or the CHED law also emphasized the use of ICT for the enrichment of teaching and learning in Higher Education Institutions (HEIs). Salgado (2000), in his article "The State of Philippine Universities and Colleges in the Era of Globalization," presented the continuous demand of achieving the goal of producing graduates and products that are world class and can compete globally. The government has taken the position that science and technology are vital to national development. The experience of First World Countries and that of the Newly-Industrialized Countries all point to science and technology as the major factor in accelerating and sustaining their economic growth. This is a direct consequence of a fundamental shift in the forces of production. Knowledge is now considered the primary wealth-producing resource superceding both labor and capital post-industrial society.

During the first ICT Summit, the Commission on Information and Communications Technology (CICT) presented the Philippine ICT Roadmap for the year 2006 up to year 2010. One of the programs undertaken by CICT is the Community e-Center (CeC) which aims to bridge the 'digital divide' in the country by providing affordable Internet access to communities. The agency has given priority to projects which move toward providing universal access to ICT goods and services by all Filipinos (CICT, 2007). To this effect, a consultation with ICT professionals was held as CICT presented the strategies and programs it will adopt to develop an accessible and world-class ICT sector. The roadmap identified universal access to ICT as primary among its programs and initiatives.

Despite these efforts to stride towards technological advancements, our country continues to lag behind its ASEAN neighbors and industrialized countries. "Digital divide" has been an emergent problem that deliberately persists. While there have been many studies that have examined the 'digital divide' across countries, there is a current dearth of studies that account for the differences in skill, access, utilization, and ownership of these ICTs to the following: age, gender, marital status, geographical location of workplace, educational qualification, ownership of technology, and socio-economic factor (Loh-Ludher, 2001; Tuaño, 2006).

There is then a heeding call for scientific inquiry to identify the grounds of digital divide and accordingly barge into its swelling effects among the nation's educational workers. It has to be minimized if not totally combated and eradicated. Research for development is obligated in order to introduce fundamental innovation as we struggle to keep pace with the global trend.

The Department for International Development, Policy and Research (2006) highlighted the role of research in providing evidence that can shape development policies and programs. Holtzman (2008) also described research and development as a tool of strategic growth. This is according to him possessed by the world's top performing companies portraying the characteristic of superior ability and always in the face of continuous improvement. Research and Development is their strategic weapon to employ definable practices to catalyze high levels of organic growth, support above average margins in

mature businesses. Huang and Shu-Chiung Lin (2006) supported this concept on research and development in their journal on Industrial Management and Data System when they stressed on the adequate support for a more sophisticated research and management practice that will lead to better innovation performance. Opening up Research and Development enables the organizations to develop resources and depict competitive advantages (Bergfors and Larsson 2009).

Grounded on these suppositions, it is the aim of this research to conceptualize the digital divide among CHMSC faculty members that stems from a simple lack of access and skill, and limited utilization of ICTs attributed to several different factors that truly divide them.

Carlos Hilado Memorial State College, being in the forefront of achieving quality and excellence, takes part in the struggle. Its teachers are expected to level ahead in terms of technology use. In responding to the urgent call, management's plan and policies highlight the provision of access to education networks (Internet) to upgrade classroom instruction and learning as presented in the TEP Management Plan for the Academic Year 2002. Included also in the CHMSC Five-Year Development Plan are the provisions for the utilization of information and communication technology which include maintenance and sustenance of ICT resources and networked computers, increasing Faculty and students access to computers, revision and enrichment of curriculum to integrate ICT resources, granting of ICT scholarships, institution of ICT training center in Western Visayas, leading as ICT Internet service provider in the province, and development of online enrollment system.

Digital divide is seen by many faculty members in this college as primarily caused by disparate access, skills, and use of Information and Communication Technologies. The aforementioned ideas, principles, concepts, and studies therefore provide appropriate framework and structures to the research problem on the 'digital divide' among Faculty Members of Carlos Hilado Memorial State College for academic year 2007-2008. The variables considered in this study include age, gender, marital status, location, educational qualification, subject/s taught and ownership of technology (personal telephone and computer, and Internet subscription. Factors affecting 'digital divide' among CHMSC

faculty members will be unveiled to serve as fundamental basis in the formulation of a Proposed Development and Intervention Program.

The digital divide is not an absolute phenomenon which will be there forever (Arsons, 2000). There is so much can be done in order to minimize, if not to totally eradicate this phenomenon. A closer look at the data will lead to the formulation of a program that will ensure effectiveness in the classroom and productivity and finally effect to the "strength of the college."

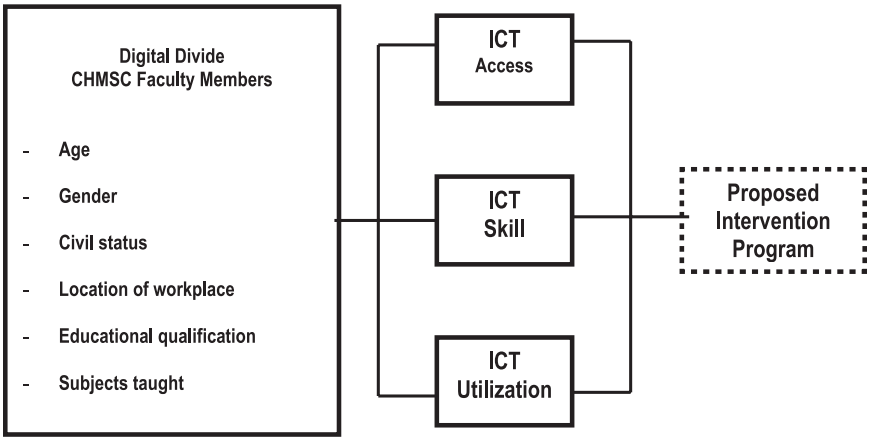

Figure 1. Schematic diagram illustrating the theoretical framework of the study.

OBJECTIVES OF THE STUDY

This research aimed to determine the 'digital divide' among the Faculty Members of Carlos Hilado Memorial State College for academic year 2007-2008.

More specifically, this study aims to answer the following sub-problems:

(1) To determine the profile of CHMSC faculty members as to age and gender, civil status, location of workplace, subjects taught, educational qualification and ownership of technology

(2) To assess the level of access of CHMSC faculty members to Information and Communication Technology (ICT) in terms of access to computers, access to internet and access to multimedia

(3) To compare the level of access of CHMSC faculty members to ICT if they are grouped and compared according to the following variables: age and gender, civil status, location of workplace, subjects taught, educational qualification and ownership of technology

(4) To assess the level of skill of CHMSC faculty members in terms of use of Information and Communication Technology (ICT) according to cognitive, psychomotor; and affective domains

(5) To compare the level of skill of CHMSC faculty members if they are grouped and compared according to the aforementioned variables

(6) To determine the extent of ICT utilization of CHMSC faculty members

(7) To compare the extent of ICT utilization of CHMSC faculty members if they are grouped and compared according to the aforementioned variables

MATERIALS AND METHODS

The present study is an attempt to describe the 'digital divide among CHMSC faculty members by assessing their level of access to ICT, level of skills in ICT, and extent of utilization of ICT for academic year 2007-2008. In view of the nature of the research problem, the investigation necessitated the use of descriptive type of research methodology. This research method is designed to gather information about present existing conditions, relationships that exist, beliefs that are held, practices that prevail, effects that are felt or trends that are developing. The method does not call for data gathering alone but also systematizes the presentation, description, and interpretation of data gathered and furthermore includes the study of relationships between and among variables (Deauna, 1996).

The faculty members of the college, being the catalysts in student's learning, have continuing efforts to upgrade their shills through education and training. For the past two years, not only did the numbers of faculty members increase but also their qualifications. The faculty workforce in four campuses expanded by 17.8 % with a marked increase in the hiring of part-time faculty members.

The subject-respondents of the study are exclusively the faculty members from the four campuses of Carlos Hilado Memorial State

College for the academic year 2007-2008 who may possess very high or very low level of ICT skills, who may have adequate or inadequate access to ICTs, or may have very extensive or limited use of ICT, for the academic year 2007-2008. They were chosen as samples at random irrespective of their gender, age, location, subject/s taught, and educational qualification. Samples will be drawn using the stratified sampling method. The formula in determining the samples is as follows (Subong, 2000):

A researcher-made survey questionnaire was used to get information related to the conduct of this study. The first part of the questionnaire contains fields that present basic personal information about the respondents. The questionnaire proper is divided into four (4) components: (a) level of ICT access, (b) level of ICT skills, (c) extent of utilization, and (d) development and intervention program done by the college in increasing level of ICT access, level of access to ICT, and extent of ICT utilization. The final part presents the development or intervention program of Carlos Hilado Memorial State College to increase the level of ICT access, level of ICT skills, and extent of ICT utilization among its faculty members.

The questionnaire was subjected to face and content validation by ICT and education experts composed of three (3) professors in the doctoral program of CHMSC and two (2) ICT professors with master's degree. They checked on the appropriateness, meaningfulness, and usefulness of the inferences made based on the data collected. According to Subong (2005) , "Validation of an instrument is the process of collecting evidence to support such inferences." Necessary recommendations for the improvement of the said instrument were considered in the finalization of items included.

After the validation of the instrument, reliability was established. Subong (2005) defines reliability as "the consistency of the scores using the instrument measuring same thing with similar research. It also measures how well the instrument agrees with itself." In this study, the Test-Retest Method was used to examine the reliability of the questionnaire. The validated instrument was first tested to twenty (20) MAED (Master of Arts major in Educational Management) and MBA (Master in Business Administration) graduate school students of Carlos Hilado Memorial State College taking up Computer Education subject.

After twenty (20) days, the same questionnaire was administered to the same group. Pearson-Product Moment (PPM) was then used to correlate data for this method. The coefficient of correlation should be high or very high for the instrument to be reliable. The result was interpreted based on the following:

After subjecting the constructed questionnaire to validity and reliability tests, a letter of request approved by the Office of the President together with the outline of the study was properly secured for the conduct of survey. It was then fielded to identified respondents and collected for tabulation. All of the data gathered were collated, treated and analyzed in accordance to the research design and the aforecited hypotheses of the study. Appropriate statistical software was used for a more efficient, effective and accurate treatment of data.

The data were analyzed using the Microsta program. To clearly illustrate the statistical treatment and analysis of data, the following steps were adopted:

Level of access to ICT was determined by adequacy or inadequacy of opportunity to use computer, Internet and multimedia in doing or complying with school works and activities.

The level of adequacy of ICT Skills is strongly anchored on the ASSURE model presented in the works of Heinich (2002) and Molenda (1996) which analyzes the learner's entry competencies taking into consideration their ICT skills in the cognitive, psychomotor and affective domains.

Extent of utilization of ICT is indicated by the number activities for each software a respondent can perform. These softwares include word processor, spreadsheet, electronic presentation, graphics, multimedia, and Internet. Each software has identified ICT activities placed in the upper boxes and the fifth box which correspondingly indicated no performance of any activities mentioned above, is placed at the bottom. The number of boxes checked determined how extensively a particular software was used by the respondent. The score of 4 was interpreted as very great extent (VGE), 3 interpreted as great extent (GE), 2 interpreted as moderate extent (ME), 1 interpreted as lesser extent (LE), and 0 interpreted as no extent (NE). Based on the tallied frequency multiplied by the score, the mean was generated to provide the total picture of the extensiveness of utilization.

Sub-problems 3, 5, and 7 which deal with the significant difference in the level of ICT access, ICT skill, and extent of ICT utilization when grouped and compared according to gender and civil status called for the T-test. The Researchers often use the t-test when they make comparative studies that will evaluate the differences in means between two groups (Subong, 2005).

While sub-problems 3, 5, and 7 which deal with the significant difference in the level of ICT access, ICT skill, and extent of ICT utilization when grouped and compared according to age, location of the workplace, qualification and subjects taught called for Simple Analysis for Variance (ANOVA). ANOVA is a simultaneous test taking the samples all at single time (Pagoso, et. al, 1992). It is based upon two sources of variation – the between column variance (SSb) and the within column variance (SSw). The sum of the two variances makes up the total sum of squares (TSS).

RESULTS AND DISCUSSION

The significant findings in this investigation are presented according to the specific problems of the study. CHMSC faculty members with age 41 to 50 consisted the highest percentage (32%) of the total 149 respondents with 32 members while those whose age is 61 up to 70 comprised the lowest percentage (2%) with only 2 members. Faculty members grouped in the younger bracket are above by 7% than those classed in the middle bracket and by 10% than those classed in the older bracket.

The female group composed of 88 CHMSC faculty members exceeded by 18% the male group with only 61 members. Faculty members with married status, ending up with 110 respondents comprised 74% of the total while and only 26% correspondingly with 39 respondents came from the single or unmarried group. Married faculty members is overhead by 35%. Of the total 149 CHMSC faculty members randomly selected as subject-respondents of the study, the 48% came from Talisay campus, 24% represented Binalbagan campus, 17% were from Alijis campus, and only 11% from Fortune Towne campus. Sixty-three percent (63%) of 149 CHMSC faculty members handle academic subjects, 28% are vocational subject teachers, and 9% of them are handling both subjects.

Only 3% of 149 faculty members are full-fledged holders of doctorate degree, 16% have earned doctoral units, 20% are masters' degree, 48% are with masteral units, and only 13% are baccalaureate degree holders and have not yet pursued any graduate studies. Faculty members with masteral units which is ranked second from the lowest show dominance in number. Seventy percent (70%) of 149 faculty members, essentially the highest percentage, owns a telephone and/or cellphone, 56% have personal computer, 43% have available audio-visual equipment, 32% are Internet subscribers, only 7% owns a fax machine, and 9% claim to have owned other technologies excluded from those mentioned.

The level of access of CHMSC faculty members to Information and Communication Technology (ICT) in terms of: (a) access to computer, (b) access to Internet, and (c) access to multimedia is less adequate. When taken by campus, only Alijis campus' faculty members showed adequate access to ICT while less adequate for Binalbagan, Fortune Towne and Talisay campuses.

There is significant difference in the level of access of CHMSC faculty members to ICT when grouped and compared according to age, gender, location of workplace, and subject/s taught; conversely, no significant difference exists among them when the grouping was based on civil status and educational qualification.

The level of cognitive skill of CHMSC faculty members in terms of use of Information and Communication Technology (ICT) is average.

When taken by campus, only faculty members from Alijis showed high level of cognitive skill in ICT, whereas, faculty members from Binalbagan, Fortune Towne and Talisay exhibited only average level of cognitive skill in ICT. The level of psychomotor skill of CHMSC faculty members in terms of use of Information and Communication Technology (ICT), taken as a whole and by campus, is average. The level of affective skill of CHMSC faculty members in terms of use of Information and Communication Technology (ICT), taken as a whole and by campus, is high.

There is significant difference in the level of skill of CHMSC faculty members when grouped and compared age, gender, civil status, subject/s taught, and educational qualification; while no significant difference was found to exist when they were grouped according to location of workplace.

CHMSC faculty members generally exhibited moderate extent of utilization of word processor and Internet while lesser extent of utilization of spreadsheet, electronic presentation, graphics, and multimedia. When grouped by campus, faculty members from Alijis and Fortune Twone campuses showed moderate extent of utilization of ICT while lesser extent of utilization for faculty members in Binalbagan and Talisay campuses.

There is significant difference in the extent of ICT utilization of CHMSC faculty members when grouped and compared age, gender, civil status, location of workplace, subject/s taught, and educational qualification. The programs and projects instituted or established by the college are inadequate and not substantial to either advance ICT access, skill, and utilization or bridge/cause intervention to the digital divide.

CONCLUSIONS

Based on the different findings, the following conclusions are hereby formulated:

CHMSC faculty members are on the "poor side" of the digital divide as indexed by their inadequate access to computer, Internet and multimedia. CHMSC faculty members' level of access to ICT is less adequate. Computer, Internet and Multimedia from different sources are not at any time and in any place available or obtainable.

Faculty members, classified and subdivided according to age, gender, workplace location, and subject/s taught significantly differ in their level of access to ICT. On this account, these factors are consequential to their acquisition and opportunity to avail of these Information and Communication Technologies.

CHMSC faculty members' level of ICT skill is average. They possess, although not so high, adeptness in the use of ICT and similarly, manifest strong desire to learn ICT or update their cognitive and manipulative competence in ICT.

Age, gender, civil status, subject preparation, and qualification bear notable effect to the level of ICT skill of CHMSC faculty members; on the contrary, location of workplace is found to be negligible. Quite below the passable margin, CHMSC faculty members exhibit limited use of the ICT.

CHMSC faculty members significantly differ in their extent of ICT utilization when grouped according to age, gender, civil status, location of workplace, subject/s taught, and educational qualification. Faculty members' level of ICT skill is equivalent to their extent of utilization, but with level of access slightly digressed.

The College ICT capability must be enhanced especially along extensive adoption and use of ICT through increased level of access and skill.

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