

QUALIFICATIONS OF INFORMATION TECHNOLOGY TEACHERS: THE ROLE OF EDUCATION AND CERTIFICATION

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ABSTRACT: The Institute for Certification of Computer Professionals (ICCP) Education Foundation awarded a grant to the Applied Computer Science Department at Illinois State University to survey the qualifications and certifications held by teachers at the kindergarten through twelfth grade levels who teach information technology. The survey instrument was mailed to the Superintendents in the Office of Education in every state plus the District of Columbia. The response rate was 100%. Results show that 55% of states have a minimum standard requirement for information technology teachers in junior high and high schools. Only 11 states require certification for computer literacy teachers at the grade school level. This article draws upon the results of this survey, a literature search for similar surveys, and the author's experience.

KEYWORDS: Teacher Certification, ICCP, Information Technology Education

The computer has proliferated in classrooms in the United States for at least the past decade. This same era has been characterized by the haphazard designation of teachers to instruct in the rapidly growing discipline of information technology. Frequently asked is how well-qualified are teachers of information technology and how well do they keep up with rampant technology change.

BACKGROUND

Literature search

A literature search revealed a few articles about professional certification in information technology, but no comprehensive surveys of the composition and qualifications of teachers of information technology.

Research on certification of computer teachers can be traced back to 1975.

Taylor and Poirot at that time reported that two states offered computer science teacher certification (5). Articles published between 1976 and 1979 reported that four states offered computer science teacher certification. Harriet Taylor found in 1983 that five states had computer certification requirements. She also reported that at least one third of states have adopted special school accreditation guidelines for determining who is allowed, whether certified or not, to teach information technology courses. Finally, Taylor reported that it is common to designate teachers who are certified in certain subject areas (e.g. math), to be authorized information technology/computer science teachers, regardless of how much computer-related training they may have (4). Poirot, Taylor and Norris in 1988 identified twelve states that have certification standards for information technology/computer science teachers.

Kiper, Rouse, and Troy stated in 1989 that although many entering college freshmen have had some experience with microcomputers and BASIC programming, their high school courses have largely ignored structured programming and problem solving (1). Thus, students continue to lack the skills required for using computers effectively. Well-qualified classroom teachers are a critical component of a strong computer curriculum. Ideally, the expertise of entry level teachers of information technology would approximate that of entry level practitioners in industry.

The Impetus

Since its founding in 1973, the Institute for Certification of Computer Professionals (ICCP), has offered computer certification in information processing to promote and sustain high professional standards in the information processing industry. It offers certification in

four computer professional designations: Certified Computer Programmer (CCP), Certified Data Processor (CDP), Certified Systems Professional (CSP), and Associate Computer Professional (ACP). The ICCP is a non-profit organization and has been actively promoting qualified computer education at all levels. Their growing concern for qualified information technology teachers prompted the need for a current nationwide survey to identify the current standards for teachers.

The Institute for Certification of Computer Professionals (ICCP) Education Foundation awarded a grant to the Applied Computer Science Department at Illinois State University to survey during the 1989-90 academic year the qualifications and certifications of teachers between the levels of kindergarten and twelfth grade inclusive. The purpose of this research was to determine what education and certification qualifications individual state and/or governing boards required of these teachers. Previous research in the area of computer science teacher certification focused on secondary school levels, whereas the scope of this study encompasses grade schools, junior high schools, and high schools.

RESEARCH METHODOLOGY

A questionnaire was developed and sent to Superintendents in the Office of Education in every state plus the District of Columbia. The response rate was 100%, a combination of 92% responses by mail and 8% resulting from telephone follow-up to those who failed to return the written questionnaire.

The survey addresses certification requirements in three teaching areas: computer science, data processing, and computer literacy. Furthermore, the levels of education are divided into high school, junior high school and elementary school.

The survey explores whether and how each state certifies its teachers and which states have any "grandfather" clause. For those states not requiring teacher certification, the survey inquires

about specific qualifications for teaching computer subjects.

Terminology

Because of confusion which frequently surrounds computer-related terminology, specific definitions were included with the survey instrument.

- A Computer Science teacher is defined as one who teaches programming languages such as BASIC, Pascal, or COBOL.
- A Data Processing teacher instructs on software tools such as word processing, data base, spreadsheet or other software packages.
- A Computer Literacy teacher instructs on general understanding about computers and their software tools.

"Information technology" is an all-encompassing term that includes the related disciplines of computer science, information science, information systems, data processing, computer information systems, management information systems, business information systems and computer literacy.

Teacher versus Professional Certification

The different ways in which the term "certification" can be used is another source of confusion. The *Facts on File Dictionary of Education* defines a "teacher certificate" as being generally awarded by

the state and/or professional organizations for teachers, administrators, and related professional staff. Furthermore, certificates may be specifically designated by subject, grade level, etc. (3) *Facts on File Dictionary of Education* defines "competency-based certification" as a specific approach by which a state, or organization authorized by a state, determines individual eligibility for a credential. Individuals may be required to demonstrate a mastery of minimum essential generic and specialization competencies, etc. (3) To distinguish between these different types of certifications the term "teacher certification" is used here to refer to the education certificate as defined above. "Professional certification" refers to competency-based certifications administered by organizations such as the Institute for Certification of Computer Professionals (ICCP).

RESULTS

As shown in Exhibit 1, more states require certification for data processing teachers than for computer science or computer literacy teachers. Certification of data processing teachers is required by 24 states at the high school level and by 20 states at the junior high level. Certification of computer science teachers is required by 20 states at the high school level and by 19 states at the junior high level. Only 11 states require certification for computer literacy teachers at the grade school level.

Certification requirements were under development in nine states at the

STATE REQUIREMENTS	COMPUTER SCIENCE TEACHER		DATA PROCESSING TEACHER		COMPUTER LITERACY
	HIGH SCHOOL	JR. HIGH SCHOOL	HIGH SCHOOL	JR. HIGH SCHOOL	GRADE SCHOOL
Number requiring certification of computer teachers	20	19	24	20	11
Number specifying some other computer qualifications	10	9	10	8	8
TOTAL	30	28	34	28	19

time of survey. Florida, Maryland, Virginia and Wyoming expect implementation during 1992. Illinois, Missouri, Montana, New Hampshire and Vermont also are working on certification requirements.

Certification requirements can be fulfilled in several ways, including subject matter tests, total credit hours from a computer-related curriculum, prior teaching experience or by work experience. Of those states requiring teacher certification, 76% certify by credit hours taken in a computer-related curriculum. The hour requirement ranges from 5 to 30 hours, mean hours being 17.4. Not all states indicated total number of required hours because it varies by accreditation-approved programs. Subject matter tests are used by 16% of states to certify their teachers, 7% certify by prior teaching experience and 2% certify by work experience. Some states use a combination of these approaches to certification.

Qualifications other than Certification

Among those states that do not require certification, many specify some form of qualification. These qualifications range from math, business or credited course work in a computer discipline to prior teaching experience. As shown in Exhibit 2, 10 states have at least one requirement for the high school computer science teacher and data processing teacher. At the junior high level, 9 states have a requirement for computer science and 8 states for data processing teachers. At the elementary level, 8 states have some requirement. The most acceptable discipline for computer science teachers is math and for data processing teachers it is business.

“Grandfathering”

The percentage of states that “grandfather” teachers is 38%. Thus, teachers already teaching computer subjects often are not required to fulfill newly implemented or modified certification requirements. Many who teach computer subjects, especially those having done it the longest, are self-taught computer specialists.

STATE	COMPUTER SCIENCE TEACHER		DATA PROCESSING TEACHER		COMPUTER LITERACY
	HIGH SCHOOL	JUNIOR HI SCHOOL	HIGH SCHOOL	JUNIOR HI SCHOOL	GRADE SCHOOL
Arizona	Yes	--	Yes	--	--
Arkansas	--	--	Yes	--	--
Delaware	Yes	Yes	Yes	--	--
Florida	**	**	**	**	**
Georgia	--	--	Yes	Yes	--
Illinois	*Yes	*Yes	*Yes	*Yes	*Yes
Indiana	--	--	Yes	Yes	--
Iowa	--	--	Yes	Yes	--
Kansas	Yes	Yes	Yes	Yes	Yes
Kentucky	Yes	Yes	Yes	Yes	Yes
Louisiana	Yes	Yes	Yes	Yes	Yes
Maryland	**	**	**	**	**
Michigan	--	Yes	--	Yes	--
Mississippi	Yes	Yes	Yes	Yes	Yes
Missouri	*	*	*	*	*
Montana	*	*	*	*	*
Nebraska	Yes	--	--	--	--
Nevada	Yes	Yes	Yes	Yes	Yes
New Hampshire	*	*	*	*	*
New Mexico	--	--	Yes	Yes	--
New York	Yes	Yes	Yes	Yes	--
North Carolina	Yes	Yes	Yes	Yes	--
Ohio	Yes	Yes	--	--	Yes
Oklahoma	Yes	Yes	Yes	Yes	Yes
Pennsylvania	--	--	Yes	Yes	--
Rhode Island	Yes	Yes	Yes	Yes	--
South Dakota	Yes	Yes	--	--	--
Tennessee	--	--	Yes	--	--
Texas	Yes	Yes	Yes	--	Yes
Utah	Yes	Yes	Yes	Yes	--
Vermont	*	*	*	*	*
Washington	Yes	Yes	Yes	Yes	Yes
Washington DC	Yes	Yes	Yes	Yes	Yes
Wisconsin	Yes	Yes	Yes	Yes	--
Wyoming	**	**	**	**	**
TOTAL	20	19	24	20	11

* State is developing certification requirements
** Certification requirements have been drafted with implementation planned for 1992

In sum, over half the states have some form of information processing certification or qualification requirement for at least one level. In the remaining states how computer teaching positions are filled is left to the discretion of individual school boards or superintendents. No respondents commented on professional certifications offered by the ICCP.

CONCLUSION

Although over half of the states require certification of their teachers, no state has incorporated the ICCP professional certifications into their teacher certification or qualifications

guidelines. Nevertheless, in the author’s opinion, requiring ICCP professional certification of computer teachers would improve the overall quality of information technology education. Teachers will be motivated to become ICCP certified if they are financially rewarded for doing so. The initial step must be for the ICCP to improve visibility of its professional certifications among the educational community.

AREAS FOR FURTHER RESEARCH

Beyond the scope of this study is the potential impact of legislation mandating professional licensing of computer professionals on the educational

community. The state of New Jersey, which has no certification requirements for its computer teachers, paradoxically considered and later rejected legislation that would require licensing of selected computer professionals. Although computer teachers were not included in this group of computer professionals, conceivably they could be in the future. If more states consider and eventually require computer professionals to be licensed, how this impacts computer teachers should be investigated.

Other topics to address in future research include:

- any correlation between computer teacher certification, professional certification, and excellence in teaching
- effect of self-taught teachers on general quality of computer instruction

- contrast and compare qualifications of college faculties with those who teach at the kindergarten to twelfth grade levels
- a survey of educator awareness of ICCP certifications.

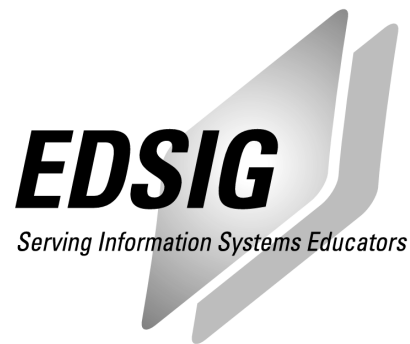
Detailed survey results are available in the final report which can be obtained from the Institute for Certification of Computer Professionals at 2200 E. Devon Ave., Suite 268, Des Plaines, IL 60018, phone 1-708-299-4227.

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