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Global Perspectives on the Role of Junior Colleges in Computing Education

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ABSTRACT

This panel presents varying global perspectives on the role of community colleges and 2- or 3-year technical schools (collectively called junior colleges here) in computing education. In some countries, students interested in a career in computing can obtain a 2- or 3-year degree instead of, or as a precursor to, a traditional Bachelor's degree. With representatives from five different countries and four different continents, the panel discusses the variety of pathways in computing education around the world, and in particular the role of community colleges and 2- or 3-year technical schools in these pathways.

Keywords – CAN DELETE IF NEEDED

Junior College; Community College; Two-Year College; Technical School; Institute of Technology; Computing Education; Further Education; Post-Secondary; Computing Programs; Global Perspectives.

1. INTRODUCTION

The landscape of higher education institutions includes, in addition to traditional universities (which may or may not have graduate programs as well as undergraduate programs), colleges and technical schools that offer shorter-term degrees and programs, usually 2 or 3 years. These schools go by varying names in different countries and for ease of reference we use the term junior college to refer to them collectively.

Junior colleges play an important role in computing education. They may be a source of students transferring into traditional university programs; they may provide terminal degrees for technician or entry level roles in computing; they may provide computing education courses in non-degree formats and to non-traditional students. The panel will discuss the purpose and role

these varying institutions from around the world play in providing computing education.

2. DISCUSSION

The members of the panel represent five different countries in which junior colleges play an important role in computing education.

2.1 Australia

In Australia the 'two-year degrees' are called diplomas, and have traditionally been offered by state-based TAFEs, government-subsidized institutes of Technical And Further Education, which also offer qualifications in the trades and other areas of education. Progression to a diploma is typically by way of a number of certificates, which would each take one or two semesters to complete.

A two-year TAFE diploma often offers a deeper coverage of core topics than a three-year university degree, as the former is tightly focused while the latter is a broader education.

Linkages between TAFEs and universities are varied. In some cases, where a TAFE and a university share the same campus, university entrants with TAFE diplomas are given close to full credit for their TAFE study; in other cases the credit is minimal.

In recent years the Australian government has extended its subsidies to private education providers, with two unfortunate effects: the TAFEs are struggling, unable to compete across a very broad spectrum with providers targeting highly specific programs such as computing; and a number of those providers have been operating questionably: inducing students with the offer of a free laptop, regardless of their academic capability; making it exceedingly difficult to withdraw from courses; and even granting diplomas after a fixed time despite never having taught the students.

2.2 Canada

In Canada, education is a provincial jurisdiction, and so the country has a distinct higher education system in each province, and the vast majority of students study at publicly funded, non-profit schools. In general, Canadian higher education offers

government regulated 1- and 2-year academic, pre-professional and trades credentials at institutes of technology, technical colleges, and regional colleges. These credentials are known as certificates (6 months to 1 year), diplomas (2 years), associate's degrees (2 years) and advanced diplomas (2+ years) in technical and career programs. In some provinces Colleges and Institutes of Technology also offer 4-year degrees, usually in career-oriented fields, and, in some provinces, technically-oriented master's degrees [3].

These institutions are not lesser versions of universities, but rather serve to provide institutional specialization within a larger education ecosystem. In some provinces, such as British Columbia and Alberta, significant effort is made to ensure that there is a seamless transition between colleges and universities to support articulation and student mobility between institutions.

2.3 China

Junior college education in China began around 1950 when a model similar to the U.S. community college system was explored and adopted [2]. The Chinese community colleges which only admitted local students now faced an awkward situation where they had trouble enrolling students, so that most of them transformed into delivering community training services.

Currently, there are two types of vocational education systems in China: the secondary vocational schools and the junior colleges. No longer limiting enrollments to the community, both types enroll students city wide, province wide, or nation wide. The secondary vocational schools provide 2 to 4 year programs in parallel with high schools. The junior colleges provides 2- and 3-year programs with lower requirements than higher colleges.

In 2014, about 5.8 million students graduated from Chinese secondary vocational schools (including general secondary specialized schools, vocational high schools, adult secondary specialized schools, and technical schools), and about 5.6 million of them successfully got jobs, which puts the employment rate at 96.68%. Very few graduates take the National College Entrance Exam (Gaokao) along with high school students and pursue higher education.

The national higher education gross enrollment rate reached 37.5%, including both junior and higher college education in 2014. About 7.3 million students graduated from national colleges, and junior and higher colleges had 3.9 million and 3.4 million graduates, respectively. Among all the graduates, nearly one million students were from computer related majors. The students whose Gaokao scores aren't high enough for higher colleges can be admitted to junior colleges. Higher colleges owned by local municipal governments such as Beijing are required to reserve up to 15% of enrollments for the graduates from junior colleges. These students can have 2 to 3 years of further study to get their Bachelor's degrees. The employment rate after graduation from junior colleges is 83.7% (from higher colleges, 66%).

2.4 Peru

Peru offers tertiary education which includes both higher education (including universities, technical colleges, and pedagogical colleges) and vocational education. Technical colleges offer 3-year academic courses focusing on technical professions such as computer technician, nursing technician, accounting technician, among others, with titles endorsed by the Peruvian government. Technical colleges also offer 1-year and 2-

year academic courses, focusing on technical and vocational education. The titles of these certificates and diplomas are only endorsed by the technical colleges themselves. Finally, technical colleges also offer several short courses, to meet a particular niche market such as Cisco, Oracle, or computer assembly, among others.

Academic institutions focusing in technical-productive areas aim to satisfy the demand of a particular niche market at the technical level or technical assistant level. These courses generally last 1 year or 6 months, resulting in "technical-productive" diplomas and certificates which are endorsed by the academic institution.

For the case of training educators, there is a specialized pedagogical college that works similarly to a technical college, but with a focus in education.

All educational institutions are governed and authorized by the Peruvian Ministry of Education. Students who want to pursue higher education such as a Bachelor's degree at a university, are able to get recognition of their previous studies.

2.5 USA

Community colleges in the United States enroll almost half of all undergraduate students [1], and play a significant role in U.S. educational pathways. The wide variety of computing programs offered at these colleges includes Computer Science transfer programs that allow students to transfer to a university to complete a Bachelor's degree, as well as Associate Degree programs (usually with names like Information Technology, Computer Information Systems, or Network Security, rather than Computer Science) that offer a 2-year degree leading to entry-level employment.

In addition to offering degrees, community colleges offer a variety of shorter-term certificate programs, usually with a narrower focus. Students may pursue certificates in conjunction with a degree, or not. Some of the students pursuing certificates are working professionals looking to learn a new technology or improve their chances of promotion.

3. CONCLUSION

There are differences in educational systems across the world, with varying institutions, purposes, length of study, terminology, and types of certificate or diploma awarded. In computing education there is often a distinction made between programs that prepare for further study and those geared toward career skills. At the same time, students moving between programs occurs. The five countries represented in this panel give only a sampling of the role junior colleges play in computing education around the world, but we can see a rich variety of perspectives.

4. REFERENCES

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