

The third role of Australian universities in human capital formation

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Abstract

The role of universities has evolved over the last twenty years. Universities were once regarded as focusing on two key roles, teaching and research, which were exogenous to, and independent from, specific economic and social development imperatives. Today, it is increasingly recognised that universities perform important roles as enablers, even leaders, of regional economic and social development and in regional innovation systems; which has been captured in the notion of a third role for universities. This paper explores the nature of the third role of universities in the Australian setting as it applies to human capital formation. The roles of universities in this regard is categorised as being either generative or developmental in nature, based on the triple helix model of university, industry, government relations and the emerging literature on university engagement. This categorisation is explored using three case studies of non core-metropolitan universities. The study explores the nature of the roles performed by the universities in human capital formation and considers possible explanations of variation in the roles performed.

Biographical note

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Introduction

The role of universities has evolved over the last twenty years. Universities were once regarded as focusing on two key roles, teaching and research, which were exogenous to, and independent from, economic and social development imperatives of the state and industry. This transformation has been captured in the notion of a third role for universities, which has been described as centring on ‘community service’ (OECD 1999), ‘regional development’ (Goddard and Chatterton 1999), ‘regional engagement’ (Holland 2001), ‘regional innovation organisation’ (Etzkowitz 2002a) and ‘academic entrepreneurialism’ (Etzkowitz and Leydesdorff 1999, p. 113). Universities have, increasingly, become anchored to place. While this shift has been acknowledged in the Australian setting (Garlick 2000, 1998; Klich 1999), little attention has been devoted to exploring the nature of the role that Australian universities perform in supporting the renewal of human capital in regional settings, and possible explanations of variation in the roles performed by universities in different regional settings. This paper explores the nature of the roles performed by three Australian universities, nested in different regional settings, in human capital formation.

Universities occupy a central position as providers of education. What is novel in the emerging literature on the third role of universities is the interaction of their traditional role in education with regional imperatives for growth and development, particularly, amidst increasing pressure from government, businesses and communities for universities to align their core functions with regional needs (Barraket 2001). The Australian literature has tended to consider the educational role of universities from a national perspective, focusing on indicators such as student intakes and distribution, graduate destination and teaching loads (DEST 2002). While there have been some studies of universities and regional engagement that have incorporated overviews of educational programs (Klich 1999; Garlick 1998), little attention has been paid to comparing the regional roles of universities in supporting the renewal of regional skills bases. The research questions addressed in this study, therefore, were: How does the role of universities in human capital formation vary in different regional settings? and What factors explain variation in the roles performed by universities in different regional settings?

This paper is structured in five sections. The second section explores the nature of the third role of universities as it relates to regional human capital formation, drawing on two major

bodies of literature that have conceptualised the role performed by universities in human capital formation in regional innovation systems. These two bodies of literature are: the triple helix model of university, industry, government relations and the literature on university engagement. While both bodies of literature have highlighted the regional role of universities in human capital formation, there are a number of differences in their conceptualisation of universities' roles, which may be utilised in analysing the nature of the third role performed by Australian universities in human capital formation at a regional level. The third section sets out the research question and design, as well as data analysis techniques. The fourth section of the paper reports the findings of the study and the final section contains a number of reflections on the significance of the study for understanding the roles that universities perform in human capital formation at a regional level.

The third role of universities in human capital formation

There are two major bodies of literature that have conceptualised the third role of universities in regional economic development. The triple helix model of university, industry, government relations posits that universities adopt a generative role in driving regional economic development, through academic entrepreneurial activities that overlap with the traditional roles of industry and the state in economic regulation (Etzkowitz 2002b; Etzkowitz and Leydesdorff 1999, 1997). The university engagement literature, while accepting that universities may well undertake generative activities, proposes that they adopt a broader, developmental focus on adapting their core functions of teaching and research, as well as community service, to address regional needs (Chatterton and Goddard 2000; OECD 1999).

In regard to human capital formation, the university engagement literature focuses on the importance of regionally-focused teaching (Chatterton and Goddard 2000), which is manifest in a stronger focus on regional student recruitment and graduate retention; the development of programs that address skills required by regional industries, particularly, SMEs; and the localisation of learning processes, for example, through workplace-based learning and regional projects. From the perspective of the triple helix model, Etzkowitz (2002a) argues that the third role of universities involves a shift from training individual students towards a focus on groups, in organisational settings. Universities increasingly 'train organisations' through teaching-based incubators that integrate entrepreneurial education and firm formation. Thus, the focus on human capital formation in the triple helix model centres on

integrating education and incubation, to create organisations, rather than educated individuals (Etzkowitz 2002a, p.122). These two bodies of literature may be utilised to construct an analytical distinction between generative and developmental roles performed by universities in regard to human capital formation at a regional level. This distinction is summarised in Table 1.

Table 1 Key characteristics of university roles in regional human capital formation

<i>Generative role</i>	<i>Developmental role</i>
<ul style="list-style-type: none"> • Integrated with new firm formation, in non-traditional contexts, notably, incubators. • Generic advanced training to support the loosening of lifetime employment, as firms are increasingly involved in lateral relationships. 	<ul style="list-style-type: none"> • Regionally-focused education, through emphasis on student recruitment, graduate retention; programs to address regional skills gaps, especially, in SMEs; development of regionally-focused learning processes.

Research design and methods

Three case studies of non core-metropolitan universities were undertaken to explore the nature of universities' contributions to human capital formation in a peri-urban region (University of Western Sydney (UWS)), a provincial city (University of Wollongong (UOW)) and a rural region (Charles Sturt University, Riverina campus).

The case studies involved semi-structured interviews with university managers, academic staff, managers of university engagement activities, representatives of local authorities, government agencies, regional coordination bodies, peak business and industry bodies and firms and other organisations that had participated in university engagement initiatives. In total, 102 interviews were conducted. The research also involved an extensive review of documentation, including: Strategic Plans of universities, Annual Reports, government reports relating to universities' human capital formation activities, other published reports, non-published reports and papers, as well as documentation relating to the composition of, and key initiatives within, the regions. The data collection focused on the nature of each university's role in human capital formation and possible explanations of the role performed.

The data collected from the study was used to classify the nature of university contributions to human capital formation as being generative or developmental in orientation, based on the key characteristics of the two bodies of literature discussed in the previous section and summarised in Table 1. The data was also organised according to evident patterns regarding the explanation of the roles performed by the universities in human capital formation.

Results of the study

The results of the study showed similarities and differences in the nature of the roles performed by the three universities in human capital formation.

University of Western Sydney (UWS)

The UWS performed a developmental role in human capital formation. This was evident in its distinctive contribution to tertiary participation and in the adaptation of a number of education programs to align with regional needs, notably, in health and education. Less attention, however, had been paid to the development of education programs that addressed specific regional industry needs, notably in the predominant SME base.

As the only university located in the region, the UWS has been in a sound position to transform the region's stock of human capital. Having been created from the amalgamation of three Colleges of Advanced Education, the University has had a history steeped in educational provision that is widely regarded as having played an important part in the development of the region. The UWS was established to lift the level of tertiary educational attainment of the regional workforce and to provide an alternative local pathway for students in the Greater Western Sydney (GWS) region who were seeking a tertiary education. Without exception, those interviewed for the study highlighted the contribution of the UWS to tertiary education participation as its leading achievement in shaping the regional innovation environment. At the time of the University's formation, the levels of tertiary educational attainment in its surrounding region were poor. Within the region, less than 2 per cent of the population had degree qualifications (Goldsmith 1991, p. 4930). By 1996, higher education participation rates in the region for the age group 15-64 increased by 43% (Reid 1998; Interviews). By 1999, 54% of the UWS student population lived in Western Sydney (Burnswoods 1999, p. 376). The University has produced approximately 40,000 graduates

since its creation, about half of whom have found employment in the region (Interviews). This data confirms the widely-held view among regional stakeholders that the University has been an important catalyst for strengthening the skills base of the region.

However, while there were broad indications of graduate retention in the region, there was little evidence of a systematic assessment of regional skills gaps and the development of programs to address these gaps. Senior managers in the University indicated that greater attention would be paid in the future to deepening the alignment of education programs with regional knowledge needs. But, there was some evidence that this was beginning to occur already. For example, in 2002, the School of Nursing, Family and Community Health obtained a \$1 million grant to help combat the shortage of mental health nurses in Western Sydney. This allowed the University to increase support to undergraduate students in their mental health clinical practice placements as well as developing new nursing programs and providing hospital-based scholarships at the postgraduate level. The University also provided customised education programs to regional firms, principally through its Graduate Business College. For example, an in-house Masters degree program specialising in marketing was being delivered to a major regional organisation in the defence and aerospace industry. However, from the interviews conducted with senior University managers it was apparent that the use of the term 'customised' sometimes related more to the packaging and branding of qualifications than detailed revision of curricula to meet specific organisational needs.

On the other hand, a number of existing programs were being 'localised'. Senior managers in the University explained that some programs in health and education were contextualised in the regional milieu. Thus, regional issues shaped the delivery of health education programs, through work placements in local hospitals, health centres and aged care facilities, as well as co-teaching undertaken by University academic staff and senior hospital staff. Similarly, education programs were grounded in the development needs of the region, through close linkages with the public education sector. But this type of customisation is, arguably, peripheral to detailed revision of content to address gaps in regional knowledge. There was little evidence of localisation of education programs linked to the knowledge needs of private industry. A notable exception to this was the development of a Cooperative Education program (CEP), where students in their final years of study undertook workplace-based research projects that added value to the relevant organisations, as well as strengthening learning processes. While most of the organisations involved were drawn from the public

sector, interviewees from a sample of firms that had participated in the Program pointed to impressive contributions to their innovative activities that had resulted from the student projects. In some cases, the CEP had also led to offers of ongoing employment for students.

Although there was evidence of efforts by the UWS to make teaching programs more responsive to regional needs, a key issue highlighted in the interviews was the importance of addressing the knowledge needs of SMEs in the region, for example, in entrepreneurial education. An important issue raised in the literature, in regard to SMEs, is the need to bridge the gap between tertiary education and the labour market. Chatterton and Goddard (2000) point out that SMEs generally require graduates to have acquired key transferable skills through their studies and work-based education, especially since SMEs do not have the resources, personnel or time to undertake skills training (Chatterton and Goddard 2000, p. 486). This, in part, is a policy issue for government. But, it is also an issue that regionally-focused education programs need to address.

The UWS performed a developmental role in human capital formation in the region through its prominent role in student recruitment and graduate retention as well as the localisation of programs and learning processes. These programs have made an important contribution to the skills base in the region. A key issue that is raised by the study is the need to address specific gaps in the local milieu, particularly in the SME base of the region.

University of Wollongong (UOW)

The UOW performed an emerging generative role in human capital formation in its proximate region. The early history of the UOW was focused on teaching and research roles that were aligned specifically with the knowledge needs of the dominant mining and steel manufacturing industries in the region. As the demand for graduates and for research in these industries diminished over time, the University had expanded the range of education programs offered to position itself as a leading national and international education provider.

At a regional level, the key contributions of the University to human capital formation were twofold. Firstly, student recruitment remains, primarily, from the proximate region. Senior University managers indicated that, while the UOW was seeking to position itself as an education provider of national and international standing, it was also considered important to

ensure that students in the region made the UOW their first choice tertiary education institution. Secondly, these managers highlighted that the University was seeking to integrate teaching and research, through Australian Research Council (ARC) industry-linked grants, Cooperative Research Centres (CRCs) and an Innovation Campus that involved the co-location of University researchers and firms, particularly, in the burgeoning IT&T industry. A shift toward a stronger entrepreneurial focus, symbolised in the development of an Innovation Campus, was linked to a more embedded approach to teaching, which supported regional clustering and, potentially, new firm formation. Thus, the role of the UOW in human capital formation was characterised as emerging generative in nature.

The education programs provided by UOW have had a marked impact on the skills base of the region. Figures provided by senior staff interviewed indicated that the University attracts almost 45% of its annual intake of school leavers from the proximate region. Taking into account mature age entry, approximately 60% of UOW students come from the Illawarra region. In the last two years, the University has also opened satellite campuses in outlying areas within its region, as well as extending its presence into nearby regions. However, academics and regional stakeholders interviewed indicated that, while, in its early years of operation, most UOW graduates were destined for employment in the region, this was no longer the case. Increasingly, UOW graduates were moving outside the region, particularly, to nearby core-metropolitan centres, and beyond. This, in part, reflected an increasing emphasis within the University on making its educational programs relevant in national and international markets.

Of greater significance was the co-evolution of the University's activities in research and its orientation towards human capital formation. Collaborative research projects were seen as vehicles for embedding teaching. Thus, CRCs, typically, engaged a number of postgraduate students who were jointly supervised by University academics and industry staff. A senior academic explained that a key feature of the Innovation Centre developed in the 1990s was the development of site-based teaching programs that were embedded in the collaborative research conducted through ARC industry-linked grants and CRCs. Thus, the UOW's linkages with key firms in the region, in part, centred on enterprise-based research projects undertaken by postgraduate students, jointly supervised, as well as the development of opportunities for company staff to teach into UOW programs and for the UOW staff to provide a significant component of technical training to firms.

While there was evidence of the integration of teaching and research, a linkage between education and academic entrepreneurial activities was lacking, as envisaged in the triple helix literature (Etzkowitz 2002a). There was some evidence of this linkage in the Innovation Centre. But, on the whole, the Centre had not reached its potential. Senior managers in the University who were involved in developing a new Innovation Campus emphasised that the integration of research and teaching, as drivers of firm formation and co-location, was a central thrust, building on the experience gained through the Innovation Centre. However, at this point, it is premature to assess the success of this approach.

There was mixed evidence of targeted programs to address regional knowledge needs, and some academics and senior University managers interviewed were doubtful of the value of such measures. The responses to questioning about the impact of the University's teaching programs on regional knowledge needs, ranged from an assertion that the University's programs were more than adequate to meet the specific demands of regional industries, to others who argued that the University should not, and could not, be expected to maintain a substantial focus on regional needs. It was important that the University's educational programs were relevant and competitive in national and international markets, rather than particularly targeting regional needs. For example, a recent innovation in the UOW's IT programs, with broad appeal, has been the integration of programming and creative training skills in a single multimedia curriculum to offer potential employers graduates who have appropriate creative and technical skills to address a growing demand by production units. That said, there have been some examples of existing programs that have been customised for regional demand. The University's Faculty of Commerce has introduced modularised, portable professional management education programs to address regional needs, particularly in large companies and other large organisations. New programs had also been introduced in logistics and supply chain management, which met particular regional needs. Examples of the latter development, however, were few.

A modest contribution to addressing local business needs was the Student Leadership and Business Development Program (SLBDP), which has been implemented with financial and in-kind support by a major business peak body in the region, the State government and the local Chamber of Commerce. In similar fashion to the CEP conducted by the UWS, this program offers final year undergraduate students and postgraduate students an opportunity to undertake a workplace-based research project that contributes to a specific need in a local

organisation as well as providing practical skills development for the student. Supported by a range of skills training sessions conducted by University staff in areas such as leadership, team building and assertive communication, the SLDBP had been well received by employers who participated in the first round of placements. University managers indicated that the Program was at an early stage of implementation and the number of students participating was limited; however, initial, informal feedback from regional firms was positive regarding the benefits of the Program as an opportunity for employers to support tertiary education in the region.

The role performed by the UOW in human capital formation, therefore, was co-evolving with its role in research. The University had been a key actor in shaping the knowledge base of the region through its teaching programs that were linked to the needs of the mining and steel manufacturing industries in its proximate region. As the range and depth of its research linkages with industry were strengthened, the University had come to place increasing importance on integrating teaching and research. This was linked to a growing emphasis on working with groups of firms, in entrepreneurial, capital forming ventures, such as an Innovation Centre and an Innovation Campus.

Charles Sturt University, Riverina campus (CSU)

CSU performs a distinctive developmental role in supporting human capital formation in the Riverina region, and beyond, consistent with the discussion of the third role of universities in the university engagement literature. CSU is the sole provider of tertiary education located in the Riverina region. The Riverina region is a rural region located some 500 kilometres from core-metropolitan centres. Data provided by a senior University manager indicated that, while 23% of the University's students are drawn from non-metropolitan regions, approximately, 60% of all graduates found their first job in regional centres, including the Riverina region. Beyond student recruitment and graduate retention centred on the region, the University's role in human capital formation occurs in a number of ways: firstly, through the development of courses that address skills and services gaps in regional centres, for example, education programs in viticulture and wine making delivered through the National Wine and Grape Industry Centre (NWGIC) and the Rice CRC; secondly, through industry education programs that are tailored to meet regional knowledge needs; and, thirdly, through the infusion of a regional perspective in mainstream education programs.

Senior managers in the University pointed out that CSU's reputation, in large part, has been founded on the introduction of programs that addressed specific skills and services shortages in non core-metropolitan regions. In this sense, the University's role in human capital formation transcended the Riverina region. Notable, in recent years, has been the development of new courses in allied health professions, such as social work, pharmacy, physiotherapy and occupational therapy, as well as nursing, medical imaging and biomedical science. These programs were not readily accessible to regional students in the past, because they were available only at major metropolitan universities. Yet, there are acute shortages of these skills in rural centres, including within the Riverina region. The University has also collaborated with other agencies to create a rural medicine education facility located in the region, which provides specific rural medical training for students of a major core-metropolitan university.

CSU supports technology transfer in the rice, viticulture and wine making industries in its region, through the provision of undergraduate, postgraduate and industry-oriented education programs that are used to disseminate research results from collaborative research projects conducted in CRCs and the NWGIC. This was regarded as an important mechanism through which CSU supported skills renewal in these industries. However, some academics were sceptical regarding the impact of these programs, because it was difficult to attract industry participation, particularly, established producers.

The University's Continuing and Professional Education Centre brokers the development of customised education programs to meet corporate needs in the region, for example, in business banking, IT for SMEs, and health service assistance for hospital and community health staff. The University's developmental role in human capital formation also extends to the development of educational programs that are linked to its research activities, notably, in the rice industry, and the viticulture and wine making industries. For example, the University's Wine and Beverage Marketing Certificate, which articulates with undergraduate and postgraduate programs, was developed in collaboration with regional wine industry bodies to meet the needs of viticulturalists and personnel involved in the liquor industry or cellar door sales. Although attracting students from other regions, this program was designed, initially, to address the knowledge needs in the University's proximate region. Similarly, the education sub-program of the Rice CRC, which is based at CSU, involves the development of industry short courses and undergraduate and postgraduate specialisations that support the knowledge needs of the region's rice industry, which is the largest in Australia .

A number of academic staff in the University explained that, unlike many metropolitan universities, CSU had determined to infuse its educational programs with a consistent regional flavour, which would provide students with a broader perspective and improve their flexibility to practice in a variety of locations. This was most evident in the allied health professions, education and social work. For example, senior academics in the Education and Nursing Faculties pointed out that the development of practicums aimed to give students several opportunities during their undergraduate years to undertake professional development in rural and remote centres. These academics also pointed out that, in some cases, students had returned to these centres following their graduation from the University. In other cases, academic staff emphasised the importance of introducing students to the realities of rural practice, for example, by providing a greater variety of professional development experiences in rural settings and by the judicious use of regional cases and materials. Table 5 summarises the roles performed in human capital formation by the three universities studied.

Table 5 Summary of the universities' contributions to human capital formation

<i>University of Western Sydney</i>	<i>University of Wollongong</i>	<i>Charles Sturt University (Riverina)</i>
<ul style="list-style-type: none"> Developmental role, through: regional focus on student recruitment and graduate retention; localisation of education programs; limited targeting/customisation of education programs. Weak in addressing needs of SMEs. 	<ul style="list-style-type: none"> Emerging generative role, through: integrating education and research, and embedding within capital formation projects. Limited focus on regionally-oriented student recruitment and targeting on education programs. 	<ul style="list-style-type: none"> Developmental role, through: regionally-focused education programs, student recruitment and graduate retention.

Explaining variation in the roles performed by the universities in human capital formation

Table 5 shows that, although all three universities had a significant emphasis on student recruitment from their regions and, to varying degrees, graduate retention, the UOW performed an emerging generative role in human capital formation, while the UWS and CSU performed developmental roles. This variation was explained by differences in the orientations of the three universities to regional engagement and the history of university-

region linkages. Both the UWS and CSU had emerged from the Colleges of Advanced Education system in Australia and had developed a sound track record in providing post-secondary education to meet regional needs. Indeed, this was regraded as a key plank in CSU's orientation to regional engagement. The UOW, on the other hand, also had a strong record in regional education, but this was complemented by the development of deep research linkages with key medium and large firms in its region and an orientation to engagement that positioned the University as a key driver of regional economic development. The UWS espoused a broad-based commitment to regional economic and social development, but had a weaker orientation to economic development than the UOW.

In CSU, the geographical isolation of the region was also a key explanatory factor. Located in a rural region, CSU's management had sought to develop programs that addressed shortages in regional skills and services, as well as customising programs to meet the needs of regional employers and infusing educational programs with local material. The UOW's espoused and enacted focus on leading regional development in the Illawarra region, evident in the history of University-industry linkages and a growing emphasis on entrepreneurial, capital formation projects explained its emerging generative role in human capital formation. The University was integrating its teaching and research functions, embedded within capital formation and knowledge capitalisation projects, notably, an Innovation Centre and an Innovation Campus. Although the outcomes of this shift were unclear, there was an intention to focus on group-based approaches to regional engagement within which teaching would be embedded.

The UWS and CSU had quite different orientations to regional engagement and trajectories of engagement with their regions. A key feature of regional engagement was to make education and research programs regionally-relevant. CSU, in particular, had built its identity on serving the educational needs of the Riverina region and other rural regions. Similarly, the UWS, as the only university located in the fastest growing region in Australia, had assumed a key role in enhancing tertiary education participation rates in its region. This was consistent with their histories, having been created from Colleges of Advanced Education with teaching-focused engagement with their regions. Rather than a focus on linking teaching with knowledge capitalisation and other capital formation projects, therefore, the UWS and CSU emphasised the importance of supporting regional needs through targeted and customised human capital formation strategies, including student research projects. CSU was the clearest example of this orientation. This was explained by the geographical isolation of the Riverina

region, which was viewed as an opportunity for the University to build its orientation to regional engagement as addressing skills and services gaps in the Riverina region and in other rural regions.

Conclusion

It was noted earlier that there has been little attention devoted in the Australian literature to exploring the role that universities perform in human capital formation, at a regional level. A recent government review of the Australian higher education system emphasised the importance of universities in shaping regional skills pools, as enablers of innovation-focused regional development (DEST 2002). But there was little analysis of their regional role, except through aggregate statistics on student and teaching loads, research income and macro level outputs, such as publication levels. There has been little attention devoted in the Australian literature to examining the nature of universities' contributions to human capital formation at a regional level and the explanation of variation in the roles performed by universities in different regional settings.

The study contributed to filling this gap by highlighting the key role performed by the three Australian universities in shaping the development of regional innovation systems, informing their educational offerings by reference to regional needs. In the UWS and CSU, this was a distinctive feature of the roles that they performed in their regions. CSU's developmental role in human capital formation extended beyond its primary regional context to other rural regions in Australia, through adaptation of its education programs to address skills and services gaps in the Riverina region, and beyond, as well as infusing learning processes with regional material and targeting education programs to regional clients. This confirmed the results of a study by Garlick (1998), which pointed to a number of examples of locational customisation of educational programs by Australian universities. The UWS followed a similar approach, though with less depth. On the other hand, there had been a co-evolution in the orientation of the UOW to research and to teaching with an increasing emphasis on linking education to generative growth. Although not fully consistent with the notion of 'teaching organisations' or 'creating organisations', as discussed in the triple helix literature, the UOW case pointed to an emerging generative role in human capital formation. Of the three universities studied, this was the exception. On the whole, the universities performed a developmental role in human capital formation, consistent with the university engagement

literature. The variation in the roles performed by the three universities in human capital formation appeared to be explained by their orientations to regional engagement and the history of university-region linkages.

A key question that is raised by the study is the importance of a generative role performed by universities. It may be argued that the heart of the matter is the relevance of the contributions made by universities to regional needs. Whether that contribution is generative or developmental is a second order issue. There is, arguably, a danger in using an analytical framework such as the one applied in this paper, that one or other approach is seen as 'better'. However, this position is problematic. The reality is that the relationships between universities and their regions mature over time and what is best at one point may not be so at another. Equally, what is best for one university or region may not be suitable for another. Certainly, there may be merits in a generative role performed by a university, in terms of the sustainability of the university itself and, perhaps, its own confidence and credibility as a key regional actor. However, the core message suggested by this study is that universities are making valuable contributions to enhancing the human capital stock in their regions, that are consistent with community expectations and the evolution of the role of universities.

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