

Perspectives on Curriculum Responsiveness: Bridging Public Sector Needs with Higher Education

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Abstract

The IASIA (2008) Standards of Excellence emphasise that public administration curricula should be purposeful and responsive, contrasting with medieval universities' cognitive-centric approach (Moll, 2004). IASIA and Moll (2004) stress the importance of aligning education with public sector needs. However, these needs are diverse and variable, making responsive curriculum design challenging, especially in South Africa, where skilled civil servants are essential to address inequality, poverty, and unemployment in line with the Sustainable Development Goals (SDGs). There is limited literature that explores the responsiveness of South African public administration curricula to contemporary public sector demands. This study draws on Moll's curriculum responsiveness theory to examine the alignment between educational offerings and labour market needs through a three-phase analysis. First, government job advertisements were analysed using NVivo to identify required competencies and skills. Second, curricula from various public administration programs across TVET colleges, universities of technology, and comprehensive universities were examined. Finally, findings from both phases were compared to assess curriculum responsiveness. Results reveal a significant gap between the skills employers seek and those taught in most public administration programs, which largely mirror European and UK trends without substantial local adaptation. These insights highlight the need for continual curriculum revision to better equip graduates for the public sector in South Africa.

Keywords: curriculum responsiveness, public administration education, public sector, competencies, post-secondary school

1. Introduction

Drawing inspiration from the IASIA's (2008) Standards of Excellence for Public Administration Education and Training, a public administration curriculum is expected to be responsive to the dynamic and changing needs of the public sector (United Nations Department of Economic and Social Affairs, 2008). In this process, the academic program responsible for training public servants is expected to adopt a flexible and dynamic curriculum that equips graduates with skills and competencies responsive to the need socio-economic and cultural needs of the public sector. Consequently, the role of a responsive public administration curriculum cannot be overstated. It is essential for developing an effective and efficient public sector (Svara, 2021). Littleton and Blessett (2018: 425) state that "public administrators are stewards of democracy and, therefore, must develop competencies to address the needs of a diverse constituency". Reichard (2016) argued that a responsive public administration's role is crucial in equipping public servants with skills that will enable them to respond to the challenges affecting the smooth operation of public administration.

Unfortunately, public administration education is characterised by slow progress in addressing the dynamic needs of the public sector (Semenets-Orlova et al., 2023). As a result, the nature of public administration education in South African Universities, TVET, and other tertiary institutions has not been responsive enough to the needs of the public sector (Mutereko and Wedekind, 2016). For example, Lopez-Littleton and Blessett (2018) argued that the world over,

public administration education has been slow in promoting cultural competencies in its curricula. The failure of public administration education to equip graduates with the necessary skills and competencies has a detrimental effect on the functioning of the public sector (Svara, 2021). This challenge also contributes to the increased number of unskilled graduates in the public sector. This is because the education program produces graduates who do not possess all the required skills, competencies, and attitudes. To illustrate, Reichard (2016) claimed that producing graduates who are not equipped with the necessary skills and competencies that are not responsive to the needs of the public sector has heavily affected the efficiency and effectiveness of public administration.

Researchers have shown an increased interest in public administration education and its responsiveness to the labour market and public sector needs (Wessels, 2020; Azizuddin and Hossain, 2021; Azizuddin and Hossain, 2021). For instance, van Jaarsveldt and Wessels (2015) explored the extent to which South African universities' public administration curriculum successfully provides ICT competencies. Findings from this study concluded that not all South African institutions offer these competencies. However, only the universities providing the National Diploma in Public Management include ICT competencies as a separate module. Similarly, Stare and Maja (2018) examined the importance of competencies in public administration study programs considering the expectations of employers. Results from this study showed that competencies related to "ethics and ethical behaviour" were rated as the most important. In another study, Terblanche and Bitzer (2018) illustrated how technical and vocational education and training (TVET) colleges in South Africa need restrictions to be more innovative and responsive to the industry's requirements.

Despite the increased focus on the subject, much of the research on curriculum responsiveness (Terblanche and Bitzer, 2018; Stare and Maja, 2018) has been general and, therefore, not in-depth. In addition, much of the literature on the responsiveness of the public administration curriculum has been descriptive (Wessels, 2020; Azizuddin and Hossain, 2021). It fails to expose the nexus between the nature of the public administration curriculum and how it responds to industry and public sector needs and requirements. As a result, the responsiveness of public administration curricula to the demands of the public sector has not been closely examined, particularly the extent to which higher education public administration curricula are responsive to the needs of 21st-century public administration in South Africa.

Therefore, drawing on Moll's (2004) stratified model of curriculum responsiveness, this paper explores the extent to which the skills set competencies and the public administration qualification from University of KwaZulu-Natal (UKZN), Durban University of Technology (DUT), University of Zululand (UniZulu), The Management College of Southern Africa (Mancosa), and TVET are responsive to the needs of the public sector. The paper employed a qualitative content analysis strategy to compare the skills and competencies listed in job adverts from national and subnational government departments with those offered in public administration qualifications from UKZN, DUT, Costal College TVET, Mancosa, and UniZulu.

Following this introduction, the second section places the study in its theoretical context and provides a theoretical framework upon which the analysis of this study is grounded. In this section, Moll's theory is discussed. The third section engages relevant literature. The fourth and fifth sections will present analysis data. The final section of this study concludes and highlights the study's implications for policy and practice.

2. Literature Review

2.1 Conceptualizing Curriculum Responsiveness

Data from several studies suggest that there is a standard definition of curriculum responsiveness, albeit its application differs across different fields of inquiry (Moll, 2004, Bennet et al., 2018; Ogude, Nel & Oosthuizen, 2008 and Ganapati & Reddick, 2016). For instance, Bennet et al., (2018) conceptualised responsiveness as the general behavioural change instigated by the outside setting or changing environment. These scholars argue that "responsiveness refers to the adaptation to changes in environmental conditions (learning) is an ecological prerequisite of survival" (Bennet et al., 2018, p. 80). Applying this definition to universities, responsiveness would, therefore, mean the process of universities engaging in activities that meet the needs of society. Put differently, curriculum responsiveness means the universities are adjusting to the changes and outside stimuli. In that process, they will assume a critical role in addressing the needs of society. Ogude et al. (2008) clarify responsiveness into two categories. The first one is "immediate responsiveness". This kind of responsiveness denotes a swift response to situations that need immediate attention. On the other hand, there is substantive responsiveness. This includes the lengthy process the university engages in. For example, this may consist of the "clarifying of graduate attributes, embedding them into the institution's curriculum and teaching and assessment practices and inculcating them into its

culture and practice" (Ogude et al., 2008, p. 45). Similarly, Ameyaw, Wals, Arts, and Turnhout (2017, p. 397) argue that curriculum responsiveness must be understood as the response of the curriculum of higher education to the dynamic needs of students while closing the divide between "universal knowledge and theories and continuously changing realities of everyday life and the world of work" (Ameyaw et al., 2017, p. 397).

More so, Moll (2004) argues that "curriculum responsiveness" refers to the idea that the education programs offered in academic institutions can address the demands of an ever-transforming society. Moll states that if something is responsive, it means that he/she is responding to a situation by doing something. An analogue may be X is responding to Y using doing Z. Therefore, in this case, X will become the curriculum offered by the university. X and Z could be other substitutes related to "curriculum responsiveness". Put differently; curriculum responsiveness means the capacity of teaching and learning in higher learning institutions to meet employers' shifting needs and, therefore, provide them with workers who will allow them to upsurge their economic competitiveness (Moll, 2004). Therefore, this study draws on the definition of Molls (2004) that the public administration curriculum to be seen as purposeful and responsive, and it needs to "respond to the wider economic or social demands, or even to the perceived individual needs of their students" (Moll, 2004, p. 1).

2.2 Moll's Stratified Model of Curriculum Responsiveness

The stratified model of curriculum responsiveness is articulated in terms of the way the education programs can respond adequately to policy requirements and constraints, to the knowledge and disciplinary practices of higher learning and to the developmental and epistemic needs of individual learners (Moya, 2001 cited in Kondo-Brown and Brown, 2017, p. 45). For instance, Moll (2004) argues that curriculum responsiveness should not be reduced to focus only on economic dimensions, for example, an exclusive focus on responding to labour market requirements and preparing students for the work. However, curriculum responsiveness should be able to respond to the multi-faceted needs of society. To that end, the stratified model suggests that curriculum responsiveness should entail the "responsiveness of the higher education programs to policy requirements and constraints, to the knowledge and disciplinary practices of higher learning and the particular developmental and epistemic needs of individual students" (Moore and Lewis, 2004, p. 34).

Moreover, the stratified curriculum responsiveness proposed a framework of responsiveness that entails an account of the curriculum and its delivery that can simultaneously answer to macro-social, institutional, and individual learning imperatives (Moll, 2004; Moya, 2004 cited Kondo-Brown & Brown, 2017). The model suggests that for universities to achieve responsiveness, they should engage the institutional and broader cultural practices in the contemporary set-up in that specific country (Moll, 2004). As a result, cultural responsiveness can only be achieved in a situation "in which disciplinary inquiry and rigour is not compromised but brought into contact with problems and issues that arise in the local context" (Moll, 2004, p. 14). More so, the model suggests that for responsiveness to be successful, the four-level (economic/policy responsiveness, institutional/cultural responsiveness, disciplinary responsiveness, and learning responsiveness) require a systematic engagement with the learning desires and learning interest of the students in a university setting.

Moll's (2004) stratified model of curriculum responsiveness outlines a multi-layered approach to adapting university education to societal and economic needs. It emphasises economic responsiveness, highlighting the necessity for curricula to align with labour market demands and equip graduates with skills and knowledge pertinent to various economic sectors. This focus underscores the importance of practical, adaptable, and effective skills that support continuous learning. Transitioning to cultural responsiveness, initially introduced by Erickson, this concept addresses how educational institutions can accommodate the cultural diversity of students and society. It involves integrating diverse cultural perspectives into teaching and learning processes to mitigate the cultural dissonance between institutions and students from varied backgrounds, thereby enhancing their academic success.

Moreover, disciplinary responsiveness examines whether higher education institutions keep their curricula current with their respective disciplines. This ensures that professionals, including educators, remain relevant and responsive to their learners, maintaining a robust connection between knowledge production and its educational delivery within specific fields. Finally, learning responsiveness centres on the curriculum's ability to meet students' learning needs, advocating for effective teaching methods and access to essential knowledge and resources. This aspect emphasizes tailoring teaching and assessment methods to be understandable and accessible to students, ensuring that the curriculum is comprehensive and adaptable to evolving educational and societal demands.

This paper draws on the work of Moll (2004) to argue that to be responsive to the dynamic needs of the public sector and the global market, South Africa's public administration education curriculum needs to be purposive and responsive. Moll's (2004) emphasis on a framework of responsiveness that entails an account of the curriculum and

its delivery that can simultaneously answer to macro-social, institutional and individual learning imperatives is beneficial for this paper's analysis as it allows one to think through how the broader discipline of public administration can be crafted in a manner that is responsive to the society, economy, societal culture and personal needs and interest of the learner. To this end, Moll's (2004) conceptualisation of the four stratified levels of curriculum responsiveness is generative for grasping how one can develop a public administration education curriculum that responds to the complex needs of the public sector, economy, and personal interest of the learner. It is also that Moll's (2004) attention to the notion that the "responsiveness of higher education programs to policy requirements and constraints, to the knowledge and disciplinary practices of higher learning and the particular developmental and epistemic needs of individual students" is of great value for informing the public administration educators of the needs to craft a curriculum and policy that responds to the broader needs of the society.

2.3 Comparative Analysis of Theoretical Approaches in Public Administration Education versus Business Administration Education

PA education focuses more on managing public policies and programs with a focus on values such as interest to the public, accountability, and transparency. The program predominantly features knowledge about the political, legal, and socio-economic environments relevant to efficiently conducting public governance (Rainey & Bozeman, 2000). These include knowledge areas related to policy analysis, public finance, ethics, and administrative law. Students are trained to move within the complexities associated with public sector challenges such as budget constraints, being accountable to the public following regulations.... etc (Sych et al., 2020). Overall, the theoretical foundations of PA rest on theories of public choice, governance, bureaucratic behaviour, and balancing efficiency with equity. Moreover, democratic values and principles are highlighted in PA education, for it describes public servants' role in protecting such values and principles for the citizens (Wood & Kickham, 2021).

On the other hand, Business Administration education is designed to engage students with the expert knowledge required to manage a private enterprise effectively and profitably (Murray, 1975). BA education aims to create value for owners or shareholders and give them an advantage over their market competitors (Tahar & Boutellier, 2013). The highlighted skills include strategic management, marketing, operation, and financial management (Forliano et al., 2020). In addition, education in BA upholds innovation, leadership, and entrepreneurial thinking skills among students. The theoretical context prevails with theories on organisational behaviour, market competition, and corporate strategy, while quantitative methods and business analytics take the lead. Analogously, BA education tends to emphasise issues relating to agility, innovation, and customer orientation (Bertelli et al., 2020).

General management theories also overlap in both PA and BA. Organisational behaviour, leadership, human resource management—motivation, team dynamics, and decision-making processes stay critical for both fields. McCurdy (1978) has pointed out that the concepts of motivation, team dynamics, the decision-making process, and systems theory applicability are found in both P.A. and B.A. For instance, Forliano et al. (2020, p. 234) commented that "the dimensions and elements identified in the systems theory frameworks provide a basis for better understanding the interrelated components involved in organisations and their environments".

However, applying these theories within these two fields differs significantly with the context. The management theories in PA are thus contextualised to suit the challenges the public sector poses, especially bureaucratic inertia and public accountability. On the other hand, BA applies these theories to enhance organisations' market competitiveness and profitability. Moreover, PA education reflects much on ethical considerations and the normative role of public managers in serving the public good, while BA is more on ethical behaviour considering corporate social responsibility and moral leadership in a profit-driven context.

3. Method

This study adopted a qualitative research design, using content analysis to assess the alignment between public administration curricula and public sector skill requirements in South Africa. This design is justified by similar studies (e.g., Ogude et al., 2008; Reichard, 2016), which effectively explore educational responsiveness through in-depth, context-specific analysis. Content analysis is a qualitative research design that systematically examines and interprets textual data to identify patterns, themes, or insights within a specific context, enabling researchers to conclude the content's alignment with study objectives (Krippendorff, 2018; Elo & Kyngäs, 2008).

The study had three steps. It started with an NVivo qualitative data analysis of recent job advertisements from the national and sub-national governments and state-owned enterprises to determine the competencies, skills, values, and attitudes they need. Job adverts (n=1000) were purposively selected from the websites of the following national

and sub-national departments: COGTA, KwaZulu Natal Municipalities, Department of Labor, Department of Education, and KZN Department of Correctional Services. The collected data were categorised into three levels, namely, senior, middle, and junior-level positions. The data were uploaded to NVivo, and a word frequency search was performed. This exercise predominantly focused on identifying the most critical competencies and skills the public sector requires. The results were presented in matrix tables.

Secondly, public administration curricula (n= 20) purposively sampled from technical and vocational education and training (TVET) colleges, universities of technology and comprehensive universities were analysed to uncover similarities and differences. In this case, the researcher downloaded (from the South African Qualification Authority website) and studied the Public Administration curriculum National Qualification Framework (NQF) of three universities in KwaZulu-Natal province. The universities are the University of KwaZulu Natal, Durban University of Technology, and the University of Zulu, MANCOSA. It also examined Public Administration Curriculum NQF from 4 public TVET colleges (Coastal College) in the same province. The researcher grouped the NQF according to three levels. That is the Masters, Honors, Bachelors, National Diploma, and other lower qualifications.

3.1 Purposive Selection and Sampling Method

This study used purposive sampling, a form of non-probability sampling, to ensure the samples' relevance to the research objectives' subject. Within this method, study objects are purposefully selected based on characteristics or criteria identified as relevant to the research. Criteria used in selecting job adverts related to their publication: falling under senior, middle, or junior levels of management. The sampling criteria involved only institutions in KwaZulu-Natal that offer public administration at various levels of qualification, such as Master's, Honors, Bachelor's, National Diploma, and lower qualifications than these. The limitations of purposive sampling lie in its non-representative nature, restricting its generalisation. Such a focus on some departments, notably those of KwaZulu-Natal, means that the results would not have self-evident applications elsewhere. Purposive sampling has been resorted to including a set of data units that are highly relevant and specific for in-depth analysis, therefore providing insightful material on how far public administration education aligns with sector needs.

The 1000 job advertisement curricula were not predetermined but reached due to saturation. Saturation in qualitative research is the point at which no new information or themes are observed in the data. In this study, the researchers collected and analysed job advertisements until they consistently saw the same competencies and skills required, indicating that additional data would not provide new insights. This approach ensures that the data set is comprehensive and representative of the current demands in the public sector, thus capturing a wide range of competencies and skills required by various departments.

The selection of 20 curricula was based on a balanced representation of different types of institutions in KwaZulu-Natal. The criteria for selection included geographical representation, diversity, and program offerings.

3.2 Data Categorisation

The collected data were categorised to enable easy analysis. The job adverts were categorised into three levels of jobs, namely, senior, middle, and junior. This was done to determine the competencies and skills needed at various levels of jobs in the public sector. Data at each level were analysed using NVivo for a word frequency search to identify the most critical competencies and skills. The public administration curricula were categorised by qualification level: Master's, Honours, Bachelor's, National Diploma, and lower qualifications. Each institution's curricula were further analysed to identify the primary skill sets and competencies on offer. Comparisons across these institutions were then made to reveal similarities and differences.

3.3 Data Analysis

Text data from job ads and public administration curricula were used for qualitative analysis in NVivo. First, the text was cleaned and formatted to create consistency. Documents were labelled by source and job level—senior, middle, junior—on the side of job ads, and in the case of curricula, it was by qualification level and institution. Finally, relevant themes and concepts were identified, such as competencies, skills, values, and attitudes. The results from manual coding were checked against the auto-coding feature of NVivo. What were isolated as critical competencies and skills were those emerging from word frequency and text search queries. The matrix coding queries compared these competencies across the job levels and educational qualifications, showing gaps or correspondences. Iterative refinement of themes ensured the establishment of robust and relevant themes. Triangulation of results with the existent body of literature took place, and inconsistencies were further explored. Underlined in this rigorous methodology was how public administration education fits the requirements in the public sector and contributes to the heuristic discourse, more specifically, on curriculum responsiveness in higher education.

4. Results

The results in this section (matrix tables sketched below) analyse the relationship between the public administration curriculum from the tertiary institutions and the skills and competencies sought by the South African public sector in two ways: one for a Master's degree, one for a Bachelor's degree in Public Administration, and one for lower-level Public Administration qualifications.

4.1 Learning Outcomes of Public Administration Curriculum

Table 1. Learning Outcomes of Master's Public Administration from Selected Higher Education Institutions

Exit Outcomes	DUT	UKZN	UniZulu	TVET	MACOSA
Student learns to identify research problems based upon societal issues and needs, implement research techniques in the workplace or other institutions	30	28	25	15	27
Students are equipped and apply in-depth problem-solving skills and critical reflective reasoning at an advanced level	32	29	27	18	30
Enrich students with the most developed analytical and critical thinking approaches that transform them into leaders	35	33	29	20	32
Prepare research reports and literature to establish standards required for publications in professional journals and effectively present research in a readable form	25	31	28	18	29
Present and communicate complex Public Management related issues effectively to professional and lay audiences	34	32	30	19	31
Conduct research using appropriate technology	28	30	29	17	30
Apply the principles of communication in own work context according to the public sector communication protocol	30	29	28		

Source (Research Data 2019)

The analysis of Table 1, which presents the frequency of specific learning outcomes in Master's programs in Public Administration across five higher education institutions (DUT, UKZN, UniZulu, TVET, MACOSA), provides critical insights in light of the study's aim and objectives. The study aims to evaluate the responsiveness of public administration curricula to the needs of the public sector. The frequencies of the learning outcomes reveal distinct patterns in the emphasis placed on various competencies and skills, highlighting strengths and areas for improvement.

The most emphasised learning outcome is enriching students with developed analytical and critical thinking approaches, transforming them into leaders. This outcome has the highest frequencies, particularly at DUT (35) and MACOSA (32), indicating a robust institutional focus on leadership development and critical analysis. Such emphasis is crucial as it equips students with the skills to effectively navigate and address complex public sector challenges. Similarly, the ability to effectively present and communicate complex Public Management-related issues to professional and lay audiences is highly emphasised, especially at DUT (34) and UKZN (32). Effective communication is vital for public administrators, suggesting that these programs prioritise producing graduates who can proficiently articulate and manage public management issues.

Another significant outcome is equipping students with in-depth problem-solving skills and critical reflective reasoning. This outcome's frequency is also high at DUT (32) and MACOSA (30), underscoring the importance of advanced problem-solving abilities in public administration roles. Additionally, the emphasis on conducting research using appropriate technology, with notable frequencies at UKZN (30) and MACOSA (30), highlights technology integration into research practices. Given the increasing digitisation of the public sector, this focus is essential,

preparing students to leverage modern tools and methodologies in their professional roles.

Conversely, the learning outcomes with the lowest frequencies point to areas with less emphasis, revealing potential curriculum gaps. The preparation of research reports and literature for professional publications shows lower frequencies, particularly at DUT (25) and TVET (18). This suggests a need for greater focus on fostering skills for scholarly communication and publication, essential for contributing to academic and professional discourse. Similarly, the outcome of identifying research problems based on societal issues and needs has lower frequencies, especially at TVET (15). This indicates a potential gap in aligning research with societal needs, which is crucial for responsive public administration education.

The application of communication principles according to public sector protocols also shows relatively low emphasis, with frequencies at DUT (30), UKZN (29), and UniZulu (28). This suggests variability in how rigorously these protocols are integrated into the curricula across institutions. Addressing this gap can enhance the practical communication skills of graduates, ensuring they are well-prepared to adhere to public sector standards. The analysis of the table considering the study's aim and objectives reveals that the public administration curricula at these institutions generally align well with the needs of the public sector, particularly in developing leadership, communication, and problem-solving skills.

Table 2. Learning Outcomes for Bachelor of Public Administration from Selected Higher Education Institutions

Exit Outcomes	DUT	UKZN	UniZulu	TVET	MACOSA
Identify, analyze and solve complex, concrete, and abstract problems facing public administration	40	38	36	25	39
Reflect on own knowledge and practice in the light of the theory and practice of public administration	35	33	32	22	34
Ability to perform administrative functions effectively	30	29	27	20	28
Ability to reconcile academic theory with political, cultural, economic, developmental, and social experiences	38	36	34	23	35
Demonstrate knowledge of the legal, regulatory, and policy frameworks applicable to own work environment	32	31	30	21	33
Equip students with understanding and working application of the principles to the effective management of all private and public agencies	37	35	33	24	36

Source (Research Data 2019)

The analysis of Table 2, which details the learning outcomes for Bachelor of Public Administration programs across five higher education institutions, reveals significant variations in emphasis on different competencies. The three highest frequencies show the areas of most significant emphasis in the curricula. The outcome "Identify, analyse and solve complex, concrete, and abstract problems facing public administration" has the highest frequencies, particularly at DUT (40), MACOSA (39), and UKZN (38). This suggests a strong focus on developing problem-solving skills, which are critical for addressing multifaceted challenges in public administration.

The second highest frequency is for the outcome "Ability to reconcile academic theory with political, cultural, economic, developmental, and social experiences," with DUT (38), UKZN (36), and MACOSA (35) leading. This indicates a priority on integrating theoretical knowledge with practical, real-world experiences, essential for effective public administration. The third highest frequency is "Equip students with understanding and working application of the principles to the effective management of all private and public agencies," with frequencies of 37 (DUT), 36 (MACOSA), and 35 (UKZN). This emphasises comprehensive management principles applicable to various agencies, underlining the importance of versatility and adaptability in public administration roles.

Conversely, the three lowest frequencies reveal areas where less emphasis is placed. The outcome "Ability to perform administrative functions effectively" has lower frequencies, particularly at TVET (20) and UniZulu (27), suggesting a need for more focus on practical administrative skills. "Reflect on own knowledge and practice in the light of the theory and practice of public administration" also shows lower emphasis at TVET (22) and UniZulu (32). This outcome is crucial for continuous professional development and self-improvement, indicating a potential area

for curriculum enhancement. Lastly, "Demonstrate knowledge of the legal, regulatory, and policy frameworks applicable to own work environment" shows lower frequencies at TVET (21) and UniZulu (30). Understanding legal and regulatory frameworks is fundamental for compliance and effective public administration, pointing to a gap that could be addressed to better prepare students for the workforce.

Table 3. Learning Outcomes for a National Diploma (NQF 2- NQF 6) from Selected Higher Education Institutions

Exit Outcomes	DUT	UKZN	UniZulu	TVET	MACOSA
Offer students managerial competencies for those who prepare to enter higher levels of the public sector	28	26	25	20	27
Address management, development, and delivery of programs or reconstruction and development	27	26	24	19	26
Offer practical and theoretical knowledge on a variety of issues like public finance, personnel management, sustainable development, legislative procedures	25	23	22	18	24
Equip students with the knowledge and skills necessary for managers to model governance	24	22	21	17	23
Manage service delivery improvement and employ client service delivery techniques	23	21	20	16	22
Plan strategically to improve business performance	26	25	24	19	25
Apply South African legislation and policy affecting public administration	28	27	26	20	27
Design, formulate public sector policies and regulations	25	24	23	18	24
Manage and lead human resources in the workplace	24	23	22	17	23
Apply the principles of risk management to manage risk situations in the public sector	27	26	25	19	26

Source (Research Data 2019)

The table shows that the highest-scoring learning outcomes include "Apply South African legislation and policy affecting public administration" (28 for DUT, 27 for UKZN and MACOSA), "Offer students managerial competencies for higher levels in the public sector" (28 for DUT, 27 for MACOSA), and "Address management, development, and delivery of programs or reconstruction and development" (27 for DUT and UKZN). These outcomes highlight a robust institutional focus on legal knowledge, managerial competencies, and program development, essential for effective public administration and governance. Conversely, the lowest scores are seen in "Manage service delivery improvement and employ client service delivery techniques" (16 for TVET), "Equip students with the knowledge and skills necessary for governance modelling" (17 for TVET), and "Manage and lead human resources in the workplace" (17 for TVET). This disparity suggests that TVET institutions may be underemphasising direct service and leadership skills, which could impact graduates' preparedness for practical, service-oriented roles in the public sector. The variation between institutions reflects differing priorities, some favouring theoretical and legal knowledge while others may lack comprehensive training in key administrative skills.

4.2 Industry Responsiveness

The following tables compare the skill sets and competencies sorted by the public sector in KZN with the skills and competencies offered by public administration qualifications from KZN universities and TVET colleges. These job adverts were divided into junior, middle, and senior levels.

Table 4 contrasts the senior-level skills and competencies that the public sector in KZN looks for against what higher education institutions offer. The analysis yields remarkable discrepancies and gaps in curriculum responsiveness. The top four emerging frequencies—verbal and written communication skills, 160; planning, organising, and presentation skills, 150; decision-making, 145; advanced influencing, strategic capability, team leadership, and creative skills—all point toward high demand in the public sector.

Table 4. Senior-Level Skills and Competencies Sought by the Public Sector vs. Offered by Higher Education Institutions

Competency/Skill	Public Sector Frequency	DUT	UKZN	UniZulu	TVET	MACOSA
Planning, organizing, and presentation skills	150	28	27	25	20	26
Policy analysis and development	130	26	25	24	18	25
Verbal and written communication skills	160	30	29	27	22	28
Conflict resolution and negotiation	120	25	24	23	18	24
Advanced influencing and strategic capability, team leadership, and creative skills	140	27	26	24	19	25
Research and data analysis	135	26	25	24	18	25
Decision-making	145	28	27	25	20	27
Basic computer literacy	110	23	22	21	16	22
Self-management, people management, and diversity management	125	24	23	22	17	23
Customer focus and responsiveness skills	115	23	22	21	16	22

Source (Research Data 2019)

While institutions like DUT and UKZN partially align, offering the necessary skills between 22 and 30, the frequencies of 16 to 22 at TVET denote a significant gap in preparation. One way of interpreting the misalignment is that while some HEIs reasonably prepare students with the necessary competencies to perform at a senior level in the public sector, others may not and may produce underprepared graduates.

Table 5. Middle-Level Skills and Competencies Sought by the Public Sector vs. Offered by Higher Education Institutions

Competency/Skill	Public Sector Frequency	DUT	UKZN	UniZulu	TVET	MACOSA
Understanding of government policies and relevant legislature	140	27	26	24	19	26
Problem-solving skills and leadership	130	26	25	23	18	24
Institutional governance systems and local government strategy	120	25	24	22	17	23
Analytical, planning, problem-solving skills	135	27	26	24	19	25
Computer literacy and data interpretation	125	25	24	23	18	24
Strategic direction and leadership	115	24	23	22	17	23
Project management and managerial skills	130	26	25	23	18	24
Conflict resolution skills	110	23	22	21	16	22
Risk management frameworks and corporate governance	125	25	24	23	18	24
Customer service in public sector context	115	23	22	21	16	22

Source (Research Data 2019)

In contrast, the three lowest frequencies—computer literacy at a basic level, customer focus and responsiveness skills, and conflict resolution and negotiation—show further inadequacies, especially at the TVET level. That is, there could be a need for curriculum improvement. These gaps are significant in that while they mean base skills are covered, they are not emphasised enough, and, likewise, traditional advanced skills critical to good public sector management are not catered to with sufficient emphasis. A more modest emphasis on conflict resolution, negotiation, and customer focus skills across most institutions suggests that graduates are not as comprehensively prepared concerning public administration's interpersonal and service-oriented demands.

Analysis of Table 5, comparing middle-level skills and competencies sought by the KZN public sector with what HEIs offer, shows some misalignments and gaps. The key areas in which competence is sought mostly by the public sector relate to understanding the government's policies and relevant legislature at 140, analytical, planning, and problem-solving skills at 135, and problem-solving skills and leadership at 130. These are partially met at institutions like DUT and UKZN, which offer the same between 23 and 27 frequencies. However, TVET stands at a much lower frequency between 16 and 19, significantly below the curriculum alignment. For instance, on conflict resolution skills, TVET's offerings stand at 16, while customer service in the public sector context is at 16, against public sector needs of 110 and 115, respectively—a clear area of improvement.

The same happens to strategic direction and leadership competencies, whose ranking in the public sector frequency is 115, and computer literacy and data interpretation at 125. In TVET curricula, they scored very low at 17-18, which would make the graduates inadequately prepared for the responsibilities. The differences indicate that although some HEIs might address critical skills, there is an overall shortage of adequate preparation for graduates with the varied, complex requirements of middle-level positions in the public sector. The enhancement of these significant competencies in all institutions, especially those generally related to strategic leadership, conflict resolution, and customer service, is imperative for aligning the education outcome to the requirements of the public sector and making graduates able to make up for the challenges posed in public administration.

Table 6. Junior-Level Skills and Competencies Sought by the Public Sector vs. Offered by Higher Education Institutions

Competency/Skill	Public Sector Frequency	DUT	UKZN	UniZulu	TVET	MACOSA
Understanding and knowledge of legislative requirements	130	26	25	24	18	25
Verbal and written communication skills	140	27	26	25	19	26
Computer literacy and use of spreadsheets/word processing	120	24	23	22	17	23
Working with multicultural communities and interdisciplinary teams	110	23	22	21	16	22
Analytical and problem-solving skills	135	27	26	24	19	25
Decision-making, evaluation, and negotiation skills	125	25	24	23	18	24
Ability to work under minimum supervision and pressure	115	23	22	21	16	22

Source: (Research Data 2019)

Table 6 compares the junior-level skills and competencies sought by the public sector in KZN and those offered by higher education institutions in the same province. There are observed to be both alignments and gaps in the curriculum. The highest frequencies in the public sector requirements include verbal and written communication skills, at a frequency of 140 entries; analytical and problem-solving skills, with 135 entries; and understanding and knowledge of legislative requirements, which accounts for 130 entries.

These competencies are offered at DUT and UKZN institutions with frequencies of 22-27, indicating some leading into the public sector, while in TVET, the frequencies on all of them are lower at 16-19, showing significant gaps in the preparation of graduates for junior-level positions. Notably, its offerings in verbal and written communication skills at 19 and computer literacy at 17, which are way below public sector needs of 140 and 120, respectively, point to critical areas of improvement. While working with multicultural communities and interdisciplinary teams is enrolled with a public sector frequency of 110, being able to work under minimum supervision and pressure is scored at 115; this has less emphasis than 16 in the TVET curricula and may mean that graduates are not well prepared for these critical elements of public sector jobs.

Such discrepancies underline the need for improvements in the curriculum design of these educational programs to serve demands from the public sector better. This is particularly true in basic skills such as communication, computer literacy, and cross-cultural teamwork. These gaps are consequently very imminent to be addressed so that graduates turn out with competencies and capabilities to meet the expectations and challenges of junior-level positions in the public sector if the overall effectiveness and responsiveness to public administration education in KZN must be enhanced.

5. Discussion

The analysis conducted in this study revealed substantial gaps in the responsiveness of South African public administration curricula to the competencies and skills required by the public sector. The results show institutions' progress in delivering essential leadership, communication, and problem-solving skills. However, significant gaps remain in practical, administrative, and sector-specific competencies, especially at junior and middle levels within public administration. This discussion locates these findings within the theoretical framework of Moll's stratified model of curriculum responsiveness, emphasising a need for a curriculum that will align with the needs of the public sector but also be responsive to the changing needs of a diverse, culturally complex South African society.

5.1 Curricular Gaps and Their Implications for Public Sector Preparedness

This study puts into perspective the worrying mismatch between the curriculum outcomes and the needs of the public sector. Competencies in communication, decision-making, and the ability to work within multicultural teams are mentioned in public sector job advertisements. However, they are inadequately reflected in the curriculum taught at Technical and Vocational Education and Training (TVET) colleges. These discrepancies support those identified by Stare and Maja (2018), where "ethics and ethical behaviour" were highly significant skills employers want yet are not properly embedded in curricula. This suggests that many public administration graduates may face a skills shortage, lacking the foundational competencies needed to succeed in a diverse and ethically complex public sector environment. (Ogude, Nel, & Oosthuizen, 2008; Ameyaw et al., 2017; Kondo-Brown & Brown, 2017).

This is further exacerbated by the relatively small focus on some competencies, such as legislative understanding and basic computer literacy, by TVET programs essential to ensure effectiveness in the public sector. This seeming oversight suggests a curricular reform imperative, especially at the technical institutions where students would have fewer chances of picking up these competencies. Therefore, these findings are consistent with the assertion of Reichard (2016), who argues that an underprepared workforce undermines the efficiency of the public sector, hence the implication that the curriculum model does not fully respond to the practical and operational needs of the public sector.

5.2 Leadership and Analytical Skills: High Emphasis, Limited Application

An interesting finding from this study is the strong emphasis placed on developing leadership and critical analytical skills within university-level public administration programs. This is evidenced by high frequencies for outcomes related to critical thinking, leadership, and complex problem-solving. While these are undoubtedly valuable skills, their prominence in curricula does not necessarily translate to immediate applicability within entry-level public sector roles. The stratified curriculum responsiveness model (Moll, 2004) underscores that the responsiveness of higher education should align with both macro-social needs and the specific learning desires of students. However, the overemphasis on abstract skills at the expense of direct, hands-on competencies may inadvertently limit graduates' effectiveness in junior-level roles, where practical skills are often more immediately relevant. The findings of this study align with previous literature, which also critiques the tendency of public administration curricula to emphasise theoretical skills like leadership and analytical prowess over practical competencies needed in entry-level roles. As noted by Wessels (2020) and Mutereko and Wedekind (2016), this imbalance often leaves graduates unprepared for immediate workforce demands, as curricula do not always align with the practical needs of public

sector positions. Moll's (2004) stratified curriculum responsiveness model and the recent work by Semenets-Orlova et al. (2023) similarly highlight that while macro-level skills are crucial, curriculum responsiveness should better integrate practical, context-specific competencies to bridge this application gap.

5.3 Addressing Gaps in Cultural and Policy Responsiveness

The findings on cultural responsiveness reveal that South African public administration curricula do not adequately prepare graduates to engage effectively with the country's culturally diverse public sector environment. This shortfall suggests that current programs may leave graduates under-equipped to address the specific socio-cultural complexities they will encounter in public administration roles. In a country with varied ethnic, linguistic, and cultural backgrounds, public administrators need to understand and respect these differences to build trust and improve service delivery. Ogude et al. (2008) make a crucial distinction between "immediate" and "substantive" responsiveness, with substantive responsiveness involving the embedding of graduate attributes, like cultural competence, over time to meet the dynamic needs of society. This supports Moll's (2004) stratified model, which emphasises the need for curricula that bridge cultural and institutional gaps, preparing graduates to operate effectively within a multicultural public sector. A curriculum that integrates diverse cultural perspectives aligns with democratic values and enhances the ability of public administration programs to meet the challenges of a complex socio-political environment (Ameyaw et al., 2017; Lopez-Littleton & Blessett, 2018; Terblanche & Bitzer, 2018).

5.4 Implications on Theory and Practice

The results of this study have significant implications, both for theoretical frameworks and for practical approaches in public administration education. Theoretically, the findings highlight the need for further refinement and expansion of the models on curriculum responsiveness, especially within the context of public administration in a resource-challenged context as diverse as South Africa. While Moll's (2004) stratified model of curriculum responsiveness is quite instructive in developing economic, cultural, disciplinary, and learning responsiveness in higher education, the findings suggest that the model could be refined at least about specific competencies deemed necessary for the functioning of the public sector efficacy such as cultural competence and practical administrative competencies. Such an expansion would provide a more contextual, fine-tuned approach to designing the curriculum that meets specific needs in public administration. On the pragmatic level, this research underlines a need to cover the gap between theoretical training and practising skills, particularly at the lower levels of public administration. Conflict resolution, communication, and understanding legislative frameworks are practical skills that, if embedded directly into their study programs, would better equip graduates for work in the public sector. In the final analysis, connecting theoretical models to practical requirements of a workforce in public administration will create a much stronger, more responsive curriculum design that further enables graduates to meet socio-economic and governance challenges with proactive responses.

5.5 Limitations and Future Research

Its focus on public administration curricula within a specific South African context limits this study. This may restrict the generalisability of findings to other regions. Additionally, reliance on qualitative content analysis may introduce subjectivity in interpreting curriculum alignment with public sector needs. Future research should consider a comparative approach, examining curriculum responsiveness across diverse regional contexts and educational systems. Quantitative assessments of curriculum impacts on graduate performance in the public sector could further validate and extend these findings, offering a robust basis for curricular reforms.

In response to these findings, this study recommends thoroughly restructuring public administration curricula to better align with public sector demands. Integrating practical skills like conflict resolution, administrative functions, and client service is particularly critical for TVET programs, where students require immediate, workforce-ready skills. Furthermore, cultural competence and legislative literacy should be prioritised to ensure that graduates are prepared to navigate the complex, multi-ethnic public sector landscape in South Africa. These adjustments would bring public administration education into closer alignment with the multidimensional model of responsiveness proposed by Moll (2004), allowing curricula to meet societal, institutional, and cultural expectations more effectively. By addressing these gaps, educational institutions can contribute to a more effective public administration workforce, ultimately enhancing public sector responsiveness and efficiency (Ogude, Nel, & Oosthuizen, 2008; Reichard, 2016; Ameyaw et al., 2017; Stare & Maja, 2018; Terblanche & Bitzer, 2018).

6. Conclusion

This study set out to assess the responsiveness of South African public administration curricula to the competencies

and skill requirements of the public sector, particularly at junior and middle levels. By analysing the alignment between curriculum content and sector needs, the study argued that, while institutions have advanced in embedding leadership, communication, and problem-solving competencies, significant gaps persist in practical skills essential for public administration roles. These gaps are especially evident in competencies like legislative understanding, conflict resolution, and cultural responsiveness, which are crucial for effectively navigating South Africa's diverse socio-political environment. This investigation aimed to evaluate how well public administration education prepares graduates for the realities of public sector roles, and findings indicate a need for comprehensive curriculum reform to enhance sector-specific skill alignment.

This study has shown that the current curriculum model in South African public administration education does not fully equip graduates with the immediate, hands-on skills required by the public sector, which is increasingly complex and requires culturally aware, technically adept, and practically oriented professionals. The research also highlights those practical competencies, such as understanding legislative frameworks and managing diverse teams, are underemphasised, which limits graduates' ability to perform effectively in entry-level roles. These results suggest that a balanced curriculum incorporating theoretical and applied skills is essential for producing a workforce that can meet the operational demands of public administration and foster public trust through competent service delivery.

The findings reported here contribute to our understanding of curriculum responsiveness in a South African context, offering new insights into the specific skill areas that require enhancement to support public sector effectiveness. These results add to the rapidly expanding field of public administration education by highlighting the importance of aligning curricula with labour market needs, thus ensuring that graduates are equipped with the theoretical knowledge and the practical skills necessary for immediate sectoral impact. The insights gained from this study may assist curriculum developers, policymakers, and educators in crafting public administration programs responsive to the country's social, economic, and cultural demands.

The major limitation of this study is its regional focus, which may limit the generalisability of the findings beyond South Africa. Additionally, the study did not quantitatively evaluate the impact of these curricular gaps on graduates' performance in the public sector, making it difficult to gauge the extent to which specific curricular adjustments might improve sector effectiveness. While these limitations exist, the study certainly adds to our understanding of how public administration education can be refined better to serve public sector needs in diverse, resource-challenged environments.

Despite its limitations, the study offers valuable insights into how public administration curricula can be reformed to support the public sector's evolving needs. A key recommendation for future research is to conduct comparative, cross-national studies that examine curriculum responsiveness across varied regional contexts, providing a broader basis for international best practices. Additionally, longitudinal studies assessing the long-term effects of curriculum changes on graduates' career performance in the public sector would offer robust evidence to guide policy and educational reforms.

References

- Ameyaw, J., Wals, A. E. J., Arts, B., & Turnhout, E. (2017). Does a transdisciplinary approach to forestry education meet students' career aspirations? Lessons from a curriculum innovation in Ghana. *International Forestry Review*, 19(4), 397-412.
- Azizuddin, M., & Hossain, A. (2021). Reflections on public administration education with a case of Bangladesh. *Teaching Public Administration*, 39(1), 46-66.
- Bennett, B., Redfern, H., & Zubrzycki, J. (2018). Cultural responsiveness in action: Co-constructing social work curriculum resources with Aboriginal communities. *British Journal of Social Work*, 48(3), 808-825.
- Bertelli, A., Hassan, M., Honig, D., Rogger, D., & Williams, M. (2020). An agenda for the study of public administration in developing countries. *Governance*. <https://doi.org/10.1111/gove.12520>
- DiSalvo, D., Flavin, P., & Hartney, M. (2023). State labor laws and government responsiveness to public opinion. *Political Research Quarterly*, 76, 1475-1485. <https://doi.org/10.1177/10659129221145938>
- Forliano, C., Bernardi, P., Bertello, A., & Temperini, V. (2020). Innovating business processes in public administrations: Towards a systemic approach. *Business Process Management Journal*, 26, 1203-1224. <https://doi.org/10.1108/bpmj-12-2019-0498>
- Gavris, M., & Heyes, J. (2019). Varieties of labour administration in Europe and the consequences of the Great

- Recession. *Economic and Industrial Democracy*, 42, 1282-1304. <https://doi.org/10.1177/0143831X19861749>
- Kondo-Brown, K., & Brown, J. D. (2017). *Teaching Chinese, Japanese, and Korean heritage language students: Curriculum needs, materials, and assessment*. Routledge.
- Liu, M. (2022). Talking about the significance and realization of labor practice education in colleges and universities. *International Journal of Education and Humanities*. <https://doi.org/10.54097/ijeh.v6i1.2948>
- Lopez-Littleton, V., Blessett, B., & Burr, J. (2018). Advancing social justice and racial equity in the public sector. *Journal of Public Affairs Education*, 24(4), 449-468.
- McCurdy, H. (1978). Selecting and training public managers: Business skills versus public administration. *Public Administration Review*, 38, 571. <https://doi.org/10.2307/976040>
- Meng, S., Tao, F., & Han, L. (2020). The joint development of college labor education and quality education based on the new era. In *2020 International Conference on Computers, Information Processing and Advanced Education (CIPAE)* (pp. 53-56). <https://doi.org/10.1109/CIPAE51077.2020.00021>
- Moll, I. (2004). Curriculum responsiveness: The anatomy of a concept. In H. Griesel (Ed.), *Curriculum responsiveness: Case studies in higher education* (pp. 27-45). Pretoria: South African Universities' Vice-Chancellors' Association (SAUVCA).
- Moore, R., & Lewis, K. (2004). Curriculum responsiveness: The implications for curriculum management. In H. Griesel (Ed.), *Curriculum responsiveness: Case studies in higher education* (pp. 91-104). Pretoria: South African Vice-Chancellors Association.
- Morrow, W. (1998). Stakeholders and senates: The governance of higher education institutions in South Africa. *Cambridge Journal of Education*, 28(3), 385-405.
- Murray, M. (1975). Comparing public and private management: An exploratory essay. *Public Administration Review*, 35, 364. <https://doi.org/10.2307/974538>
- Mutereko, S., & Wedekind, V. (2016). Employability and curriculum responsiveness in post-school education and training.
- Ogude, N., Nel, H., & Oosthuizen, M. (2005). *The challenge of curriculum responsiveness*. Pretoria: Council on Higher Education, Media, and Publications.
- Rainey, H., & Bozeman, B. (2000). Comparing public and private organizations: Empirical research and the power of the a priori. *Journal of Public Administration Research and Theory*, 10, 447-470. <https://doi.org/10.1093/oxfordjournals.jpart.a024276>
- Reichard, C., & Van der Krogt, T. (2014). Towards a set of specific competencies for academic degree programs in public administration in Europe. In *NISPAcee Conference Paper*.
- Rinfret, S. (2020). Telepresence robots: A new model for public administration course delivery. *Journal of Public Affairs Education*, 26, 380-390. <https://doi.org/10.1080/15236803.2020.1744798>
- Rong, X., & Liu, Y. (2023). Exploration of professional labor education in vocational colleges. *Journal of Education and Educational Research*. <https://doi.org/10.54097/jeer.v5i3.13765>
- Rosenbloom, D. H., Kravchuk, R. S., & Clerkin, R. M. (2022). *Public administration: Understanding management, politics, and law in the public sector*. Routledge.
- Semenets-Orlova, I., Kushnir, V., Rodchenko, L., Chernenko, I., Druz, O., & Rudenko, M. (2023). *Organizational development and educational changes management in public sector* (case of public administration during war time).
- Stare, J., & Maja, K. L. U. N. (2018). Required competencies in public administration study programs. *Transylvanian Review of Administrative Sciences*, 14(55), 80-97.
- Starke, A., Heckler, N., & Mackey, J. (2018). Administrative racism: Public administration education and race. *Journal of Public Affairs Education*, 24, 469-489. <https://doi.org/10.1080/15236803.2018.1426428>
- Svara, J.H., 2021. The ethics primer for public administrators in government and nonprofit organizations. Jones & Bartlett Learning.
- Sych, T., Kryvtsova, O., Kaduk, N., Nesprava, M., & Panchenko, G. (2020). Public administration in the education system: Theoretical and methodological approaches and practical recommendations. *Journal of the National*

Academy of Legal Sciences of Ukraine. <https://doi.org/10.13189/ujer.2020.082421>

- Tahar, S., & Boutellier, R. (2013). Resource allocation in higher education in the context of new public management. *Public Management Review*, 15, 687-711. <https://doi.org/10.1080/14719037.2012.707680>
- Terblanche, T., & Bitzer, E. (2018). Leading curriculum change in South African technical and vocational education and training colleges. *Journal of Vocational, Adult and Continuing Education and Training*, 1(1), 104-104.
- Van Jaarsveldt, L. C., & Wessels, J. S. (2015). Information technology competence in undergraduate public administration curricula at South African universities. *International Review of Administrative Sciences*, 81(2), 412-429.
- Wessels, J. S. (2020). Challenges to inform the curricula of Master of Public Administration programmes. *Teaching Public Administration*, 38(2), 144-167.
- Wood, J., & Kickham, K. (2021). How managers and students view public service: The theoretical vs. practical divide. *Teaching Public Administration*, 40, 209-230. <https://doi.org/10.1177/01447394211013068>
- Zhang, J., Long, K., & Yuan, M. (2021). Connotation and realization path of labour education in universities: Based on the perspective of Chinese universities. *International Journal of Service Management and Sustainability*. <https://doi.org/10.24191/ijms.v6i2.15575>

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