

Promoting an Adaptive Educational Planning Model in the Age of Sustainable Development Goals

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ARTICLE INFO	ABSTRACT
Article history Received March 13, 2025 Revised Nov 11, 2025 Accepted Nov 16, 2025	This study aims to presents an adaptive education planning model integrating data-driven school mapping, vocational alignment with industry needs, and collaborative governance to enhance educational access and workforce alignment in Indonesia. Using a qualitative approach, we conducted in-depth interviews with 16 informants, including educational policymakers, consultants, and industry representatives. The findings indicate that strategic school placement, guided by demographic data, addresses educational equity by prioritizing underserved areas. Vocational programs aligned with local labor demands equip students with industry-relevant skills, enhancing job absorption and reducing workforce migration. Collaborative governance fosters stakeholder engagement, allowing educational institutions to adapt to socio-economic changes. Practical implications include better resource allocation in underserved regions, improved job market alignment through vocational education, and stronger local economies through talent retention. This model supports Sustainable Development Goal 4 (SDG 4) by creating a responsiveness ive, community-centered educational framework that promotes sustainable socio-economic development across Indonesia. This is an open access article under the CC-BY license.
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I. Introduction

The United Nations Sustainable Development Goals (SDG) Summit in 2023 vividly underscored the pivotal juncture of the 2030 Agenda (Asadullah et al., 2024). Within the intricate web of sustainable development goal frameworks, SDG 4, focusing on quality education, emerges as an indispensable and transformative component. Despite widespread skepticism regarding the attainability of the 2030 targets, the structured outline of SDG 4 underscores a profound international commitment to elevate global education standards (Antoninis, 2023). This alignment affirms the irrefutable integration of education with the prospective configuration of society (Benavot et al., 2024). Enhancing the quality and accessibility of education, alongside fostering lifelong learning opportunities, is not merely aspirational but foundational; these elements collectively bolster education's transformative potential, thus fortifying pathways toward a healthier planet and a more resilient, sustainable future (UNESCO, 2021).

The call for a substantial increase in educational standards reverberates globally, compelling all

stakeholders, including policymakers, educators, students, families, and academic institutions, to confront these challenges and adapt collectively (Morris et al., 2023). According to the Special Edition of the Sustainable Development Goals Report (United Nation, 2023), achieving the 17 interconnected goals will necessitate unprecedented shifts in collective attitudes and actions. The report emphasizes that, without such radical changes, the ambitions embedded within the SDGs, particularly those surrounding education, risk remaining unfulfilled. Consequently, the global education community must undertake transformative reforms, advocating for a paradigm shift that realigns educational practices with the evolving demands of a rapidly changing world.

A myriad of stakeholders in the educational sphere are actively devising strategies and proposing interventions to address these multifaceted challenges. For some, the solutions lie in reformed leadership models and strategic interventions (Abbasi & Awan, 2024; Asmamaw & Semela, 2023; Fauzi et al., 2024; J. Zhao et al., 2024), while others advocate for refined management frameworks (Aruġaslan, 2024; Rosier, 2024; Zhou et al.,

2024), the integration of artificial intelligence (Parambil et al., 2024; Zhong et al., 2024), or comprehensive educational planning (Barnett & Huang, 2024; Bose & Heymann, 2019). At its core, educational planning is predicated on the alignment of outcome-oriented objectives, meticulous design, and robust assessment mechanisms (Barnett & Huang, 2024). This approach to educational planning serves as a critical conduit, narrowing the gap between theoretical education and evolving market demands (Riedl et al., 2024). The domain of educational planning spans a vast spectrum, encompassing curriculum development (Parniawski et al., 2024; Swain & Waddington, 2020), lesson planning and pedagogy (Amador et al., 2022; Hidson, 2020), classroom management and design strategies (Gaspar et al., 2023), innovative teaching methodologies (Carmona-Medeiro et al., 2024), as well as urban planning considerations and school mapping initiatives Rooij et al. (2020). Each facet of educational planning operates within a dynamic framework that responds to the diverse and evolving needs of educational systems, ultimately striving to equip learners with competencies that resonate within an increasingly complex global landscape.

Recent discourse in educational scholarship has increasingly highlighted the importance of school mapping and urban design within educational frameworks, underscoring an evolving focus on spatial planning in education (Baker et al., 2023; Belpoliti et al., 2024; Díaz-López et al., 2022; Ignell et al., 2024). This area of study invites a redefined approach to educational planning that transcends the traditional, abstract view of education solely as a means to improve quality of life through lifelong learning (Bao et al., 2023; Bajaber, 2024; Broeck et al., 2024). Instead, there is a shift toward a more pragmatic outlook, where education is purposefully structured to address the needs of the labor market, preparing students for specific career trajectories and aligning academic pathways with industrial demands (Anyango et al., 2024; Saito, 2024).

This expanded framework emphasizes that educational planning must not only include curriculum and pedagogy but also account for the physical and organizational architecture of academic institutions. Research in urban management reveals persistent inequalities in school zoning and access, which often intensify educational disparities (Zangana et al., 2024). Schools are thus recognized as more than physical structures; they are essential institutions that embody intellectual and social functions, nurturing literacy, wisdom, and economic growth within society (Lucu & Platis, 2010; Keeney et al., 2024).

Educational planners are urged to carefully consider societal and industrial needs to prevent the emergence of misaligned human capital that is unsuited to the evolving demands of the global workforce. This approach advocates for spatial equity in educational planning by

aligning school locations and resources with regional socioeconomic patterns to ensure equitable access to quality education for all students. In Indonesia, for instance, issues in school mapping continue to present significant challenges. Data from the Central Bureau of Statistics (2021) report reveals that 7.5% of girls and 8.6% of boys are unable to attend school due to prohibitive distances, illustrating the critical impact of these spatial planning deficiencies on educational access.

In response to these concerns, this research aims to address gaps in educational planning and urban management, contributing to the realization of Sustainable Development Goal 4 (SDG 4) on quality education. This study is not only a practical response to systemic mismanagement but also an ethical imperative to transform education into a force for societal equity and sustainable development. Through this integrative approach, educational institutions and other stakeholders are positioned as pivotal players in the urban and economic landscape, tasked with cultivating adaptable, skilled human capital essential for sustainable progress.

II. Theoretical Backgrounds

A. Educational Planning and Mapping

Educational planning encompasses the systematic efforts led by public authorities to shape educational development, strategically identifying primary interventions to promote sustainable growth (Caillods, 2015). Within the framework of educational mapping, an extensive body of literature has emerged over the past two decades, tracing its evolution alongside advancements in geographical awareness, technology, and ecological sensitivity (Agrawal & Gupta, 2020; Al-hanbali et al., 2003; Anderson & Brown, 2010; Galabawa et al., 2002; Mackenzie & Neumann, 2016). As our comprehension of these interconnected domains deepens, the scope and relevance of educational mapping continue to expand, reflecting the evolving demands of sustainable development.

This strategic approach to human capital development through education is conceptualized from multiple vantage points, encompassing national policy frameworks (Heymann et al., 2014), transportation logistics and access (Bouzarh et al., 2018), the effects of educational neglect (Burke & Beegle, 2004), residential factors influencing student access (Chica-Olmo et al., 2018), and broader considerations of child well-being (Dalyot & Dalyot, 2018). These diverse perspectives converge on a central objective: aligning educational opportunities with career development pathways that respond to industrial and societal demands (Kenneth, 2017). Thus, educational planning is increasingly recognized as a longitudinal project that integrates these varied aspects into a cohesive strategy for fostering adaptable, skilled human capital. By addressing such multifaceted challenges, educational planning not only supports immediate access to education

but also lays a robust foundation for the long-term socioeconomic resilience and growth of communities. This dynamic field invites continuous exploration and innovation, underscoring the importance of aligning educational structures with both current needs and future societal shifts.

School and facility planning have emerged as essential components in embedding concrete management functions into the long-term alignment of educational goals with industry demands (Ekpoh, 2017; Kenneth, 2017). Research models continue to investigate the spatial inequalities in school distribution across diverse regions, revealing significant disparities in access to quality education. For instance, a study conducted in Mansoura, Egypt, demonstrated that applying the location-allocation model can enhance school accessibility and promote educational equity (Al-Sabbagh, 2022). Another notable model Dai et al. (2019) introduced a random, lottery-based mechanism to complement proximity-based allocation. This innovative approach repositions school facilities and services to address disparities, thereby promoting equity in educational access. Despite these efforts, empirical evidence underscores persistent differences in educational opportunities among schools, often exacerbating spatial inequalities globally.

Families with greater economic resources frequently secure access to high-quality schools by purchasing real estate in affluent areas, a trend that entrenches educational inequities (Liao et al., 2020). Such patterns of inequality highlight the need for robust planning mechanisms that not only address immediate spatial disparities but also foster a more equitable distribution of educational resources. Consequently, school facility planning must integrate spatial equity frameworks that actively counterbalance these socioeconomic divides, thereby ensuring that all students, regardless of their background, have access to quality educational opportunities. This proactive approach is critical for nurturing human capital in ways that align with both educational and industrial futures.

The issue of school zoning, mapping, and equitable distribution of educational resources is a prevalent challenge in Indonesia, as documented by various scholars (Erlangga, 2023; Sulistyosari et al., 2023). Despite global advancements in school mapping models, including innovative approaches integrating spatial analysis and demographic data, such comprehensive frameworks remain largely unexplored in the Indonesian context. This absence is particularly evident in the conceptualization of a model that incorporates spatial and demographic insights to address student distribution equitably across regions. In light of this gap, a critical research question arises: has there been an explicitly formulated theory, direction, or guideline provided by the Indonesian government that addresses the issue of student distribution with the aim of equalizing educational opportunities? Specifically, this research seeks to uncover whether a standardized set of

principles or policy guidelines exists to support education stakeholders, including school institutions, in managing student distribution more effectively. Thus, the first research question is formulated as follows: "What common principles or terms are utilized within educational policy as foundational directions in addressing student distribution across Indonesia, as implemented by education stakeholders such as school institutions?" This inquiry aims to contribute a foundational understanding of policy frameworks in Indonesia that guide equitable educational access, setting the stage for future research and potential model development tailored to the Indonesian context.

B. In Between Demography and Labour Market

The demographic profile has been explored extensively in educational research, with numerous scholars examining its multifaceted applications in this field (Choo & Gee, 2024; Iswahyudi et al., 2023; Oosthuizen, 2024). Often referred to as demographic data, this profile encapsulates a range of statistical information that characterizes various population groups and sub-groups within defined geographic or sociocultural segments (Nettleton, 2014). With recent advancements in research methodologies, demographic analysis has gained notable coherence and precision, enhancing its utility across various disciplines (Dissanayake, 2022). Demographic data serves as a foundational element, ensuring a comprehensive representation of diverse, cross-sectional respondent pools. This data allows for research findings that are both representative of and grounded in established baseline metrics (Ladanyi et al., 2017).

A prominent example of the role of demographic data in clarifying research is the work of Harbach et al. (2016), who used detailed demographic information to examine smartphone locking behaviors across eight countries. Through a robust sample of over 8,000 survey responses, the study exemplifies how demographic data facilitates nuanced, culturally contextualized insights, underscoring its value in producing empirically representative and globally relevant research outcomes. Demographic profiling is a critical element within spatial analysis and urban development forecasting, playing a pivotal role in informing and shaping strategies across multiple sectors (Joshi & Bhatt, 2024). This relevance is evidenced by the frequent integration of demographic data into a broad range of fields, extending beyond traditional applications to encompass economic and industrial development. As contemporary studies highlight, demographic information is now interwoven with complex domains such as industrial growth and workforce demands, aligning population insights with the evolving requirements of various industries (Farooq et al., 2021; Fernández-Gutiérrez et al., 2024; R. Ma et al., 2022; Poock & Beckett, 2022). The importance of demographic analysis is underscored by its application across diverse sectors, where it supports tailored strategies that respond to

specific industry contexts. For instance, demographic profiling is found to be used in the tourism and hospitality industry (Zhao et al., 2020), the automobile industry (Annamalai et al., 2020), the tobacco industry (Escobedo et al., 2020) industry, and the sports industry (Löfgren, 2016). Such examples attest to the expansive utility of demographic profiling, underscoring its role as a versatile tool for enhancing industry-specific outcomes and supporting sustainable growth across multiple domains.

Within the sophisticated body of literature on demographic profiling and its intersection with industry, numerous economic drivers emerge, including labor supply, manpower requirements, employment rates, job absorption, and labor market dynamics. Labor supply, for instance, represents the aggregate effort and time individuals allocate to work in exchange for wages or other compensation (Blundell & Macurdy, 1999; Boeters & Savard, 2013). This concept, foundational in labor economics, has been the focus of extensive research over the decades, with seminal contributions examining its complexities and empirical determinants (Blundell & Macurdy, 1999; Killingsworth, 1983; Killingsworth & Heckman, 1986; Pencavel, 1986). Labour supply theory suggests that individuals allocate their effort based on a utility function, balancing preferences between market goods and leisure within the constraints of their budgets and available time. Demographic analysis becomes increasingly relevant in this context, as factors within these economic considerations often influence individuals' choices, such as which companies or industries to select. Demographic profiling thus informs our understanding of how labour markets operate by capturing the preferences and constraints of diverse population segments. This alignment between demographic data and labour market dynamics underlines the utility of demographic profiling in economic modelling, offering nuanced insights that enhance workforce planning and policy development across industries.

Conversely, demographic analysis is equally crucial for companies aiming to forecast employee stress levels and retention rates. This need becomes particularly pressing given the breadth of literature highlighting the significant role of family proximity in employee well-being (Lin et al., 2024). As family is universally recognized as a foundational value across cultures (Schwartz, 2012), family motivation emerges as a vital psychological and spiritual support, influencing an individual's professional life and drive (Menges et al., 2017). Studies consistently demonstrate that family-related motivations enhance job performance, creativity, productivity, and workplace behavior (Menges et al., 2017; Umrani et al., 2020; Zhang, 2020). However, spatial considerations extend beyond mere physical proximity; an employee's cultural background also shapes their approach to work and impacts engagement levels (Adamovic, 2022). In this regard, geographical and

demographic analysis becomes an invaluable tool for organizations.

By examining the spatial and cultural factors that contribute to an employee's work-life balance, companies can better tailor strategies to enhance job satisfaction and reduce turnover, and, in turn, influence labour supply and manpower needs (Boeters & Savard, 2013). Such insights support aligning organizational practices with the diverse needs of the workforce, fostering a work environment focused on holistic well-being and sustained productivity. This perspective introduces a second research question: *"Does the labor market take demographic analysis into accounting for labor absorption? If so, to what extent?"* Addressing this question will clarify how demographic factors influencing employment practices and whether labor market strategies incorporate demographic insights to align talent acquisition with both workforce needs and industry demands.

C. Educational Plan, School Mapping, and Industrial Demands.

The discussion presented thus far leads to a pivotal insight: industrial needs are a fundamental force shaping educational pathways, particularly in strategic school mapping and resource allocation. This alignment between educational planning and labor market demands has been substantiated by numerous studies, demonstrating the importance of a responsive education system that anticipates the competencies required for evolving economic landscapes (Paolo & Matano, 2022; Gupta, 2024; Robst, 2007). With rising demands for specialized skills and increasingly complex job requirements (Alekseeva et al., 2021; Atalay et al., 2020; Hershbein & Kahn, 2018), a thorough analysis of educational planning strategies becomes critically urgent. As sectors like science, technology, engineering, and mathematics (STEM) experience rapid growth, the demand for robust research and development (R&D) capabilities has surged as well (Carnevale et al., 2013; Wilson & Chaddha, 2009). This shift has created a global emphasis on building a workforce equipped to meet the advanced needs of these fields. Consequently, scholars are increasingly focused on identifying how educational systems can cultivate the skills necessary to engage with emerging economic opportunities (Schultheiss et al., 2023).

This convergence of industrial demands and educational planning raises an essential question: how can educational structures be optimized to fulfill both immediate and long-term labor market needs? Furthermore, integrating demographic and geographical analyses within the labor market offers critical insights into the importance of location and distance for industrial demand (Gutierrez-Cano et al., 2024; Khan et al., 2021; Y. Ma et al., 2022; Poock & Beckett, 2022). This literature review has also highlighted the role of school and educational mapping in advancing educational quality and equity (Agrawal & Gupta, 2020; Al-hanbali et al., 2003;

Anderson & Brown, 2010; Cutter-Mackenzie-Knowles et al., 2020; Galabawa et al., 2002). The interdependence of these elements underscores the need for an integrated approach that aligns educational planning with labor market requirements. Thus, we arrive at the final research question: *"What is the optimal framework for implementing educational (school) mapping that ensures comprehensive employment absorption, creating a cohesive and responsive educational system?"* This question seeks to explore a systematic, integrative approach to educational planning that not only meets current labor demands but also anticipates future workforce requirements, thereby supporting sustained economic and educational advancement.

III. Method

In the domain of educational planning, the formulation and application of a Comprehensive School Mapping Model emerges as a pivotal instrument for optimizing educational access, ensuring resource allocation, and addressing geographic and demographic disparities. This study adopted a qualitative approach, employing in-depth interviews with 12 key informants, each of whom contributed valuable insights into the complexities of school mapping and distribution strategies across diverse regions. The methodology was meticulously crafted to capture a rich, contextually grounded understanding of the current practices, challenges, and innovative opportunities in school mapping within educational systems.

A. Interview Design

The in-depth interview method was carefully selected to capture a comprehensive understanding of participants' experiences and perspectives on current school mapping practices in educational planning. This qualitative approach aligns with Anastassiou et al. (2017) the assertion that such interviews can reveal subtle insights often absent in quantitative methods. Interview durations varied widely, with some lasting up to three hours, depending on the depth of participants' involvement and expertise in school mapping. Many interviews required multiple sessions due to unforeseen obstacles, such as inclement weather, unforeseen scheduling conflicts, or technical difficulties that hindered virtual connectivity. Interviews were conducted in a variety of settings to accommodate participants' needs best and encourage a relaxed, open atmosphere.

These settings included formal office spaces, virtual video calls, and, in some cases, informal meeting places that allowed for a less rigid dialogue flow. These varied environments provided flexibility but also introduced challenges. For instance, coordinating schedules was often complex for participants in administrative roles with demanding schedules. Additionally, some sessions were interrupted by external factors such as sudden weather changes that made it difficult for participants to attend in

person and connectivity issues that disrupted virtual discussions. One particularly unique case involved a senior educational consultant from a rural, mountainous region, where transportation is frequently affected by severe weather. This participant's initial interview was scheduled in person; however, heavy rainfall and landslides rendered travel impossible on the planned day. To accommodate, the interview was rescheduled virtually, but poor internet connectivity in the remote area created frequent interruptions, ultimately extending the interview across three separate sessions over two weeks. Despite these challenges, the multi-session structure and adaptable interview settings allowed for a thorough and reflective exploration of the complexities of school mapping. This dynamic approach provided rich, contextually layered data, illuminating the diverse realities and practical considerations within school mapping practices across varied educational contexts.

B. Sampling and Recruitment

In this study, a purposive sampling strategy was adopted to ensure that all selected participants had substantial expertise in school mapping, educational planning, and workforce alignment, with each professional possessing over 5 years of relevant experience. This sampling method aligns with the Ahmed, (2024) recommendation to improve empirical study accuracy by focusing on informants with directly relevant knowledge. The final sample consisted of 16 informants, balanced between 8 men and eight women, representing a variety of professional roles and backgrounds. This diverse group of participants, including school administrators, policy planners, educational consultants, and human resource managers from factories, companies, and startups, offers a comprehensive view of current practices in school mapping and resource allocation. The purposive sampling method was especially suitable given its ability to support confidentiality when informants may prefer to remain anonymous, which is critical in sensitive domains such as educational planning and workforce alignment (Barratt et al., 2014). This sampling approach also facilitated data saturation by selecting participants with deep, varied insights, particularly from educational consultants who had contributed to large-scale projects across Indonesia and HR managers from both established factories and new startups. Informants were drawn from diverse regions, including Bandung and Indramayu, providing perspectives on equitable access, optimal resource allocation, and the integration of education with employment needs.

Notably, data saturation was achieved within the first 12 interviews, capturing approximately 92% of identified codes (Guest et al., 2006), with code saturation generally reached after nine interviews (Hennink et al., 2017). Meaning, saturation was ultimately achieved between the 16th and 24th interviews, confirming the adequacy of the 16-informant sample to fully explore the study's themes.

Additionally, this approach to achieving data saturation aligns with Francis et al. (2010) what was noted: new themes typically ceased to emerge after a minimum of 10 interviews and were confirmed as no new themes upon analyzing three further interviews. This structured sample, combining insights from both educational and industrial domains, was critical in capturing the broad and nuanced applications and challenges of school mapping across Indonesia's multifaceted educational and economic landscapes, offering a well-rounded understanding of the subject (Bingham et al., 2022).

C. Information Description

The varied professional backgrounds of the 16 informants enriched this study by providing a comprehensive view of school mapping, resource allocation, and labor market integration within the framework of educational planning. Among the informants were school administrators, veteran educational consultants, policy planners, and HR managers with substantial expertise in policy implementation and workforce development. Selecting multiple informants within each professional category was crucial for capturing a diverse array of insights, a strategy fundamental to enhancing the depth and rigor of qualitative research (Chou et al., 2022). Participants from urban educational institutions and corporations contributed approaches to managing school mapping in densely populated regions, addressing issues including high enrollment demand and limited resources. In contrast, informants from rural areas highlighted unique challenges, including resource scarcity and logistical hurdles that affect school accessibility and educational equity.

The inclusion of HR managers provided an additional perspective by emphasizing the alignment of school mapping with workforce needs and labor market absorption goals, an approach essential for addressing skill shortages and fostering local employment opportunities. The informants offered insights into various mapping models, ranging from centralized, top-down approaches to more adaptable, community-driven frameworks. Echoing Mpewe's (2019) insights, many participants underscored the importance of fostering collaboration and transparent communication among stakeholders in effective educational planning. They highlighted the necessity of school mapping models that prioritize inclusive dialogue, community engagement, and alignment with workforce demands rather than inflexible, hierarchical structures. This approach supports not only equitable resource allocation but also aligns educational planning with regional employment needs, enhancing labor absorption rates. This viewpoint resonates with Raphael's (2004) argument that effective planning should incorporate participatory and flexible components, ensuring that educational resources and structures cater to diverse community needs while promoting sustainable workforce development.

D. Data Analysis.

The data analysis journey unfolded through the Five-Phase Qualitative Analysis Process (Bingham et al., 2022), enriching this study by expanding on concepts presented in their foundational work. This systematic approach interwove the varied narratives of each participant, constructing a detailed tapestry of insights into school mapping, resource allocation, and labor market alignment within educational planning. The initial phase, attribute coding, employed deductive or a priori coding, as described by Bingham et al. (2022) and Crabtree et al. (1999), whereby codes were established before analysis and systematically applied. This phase painted a vivid picture of the informants' demographic and professional backgrounds, grounding their responses in their unique contexts and experiences in school planning across diverse environments. Transitioning to the second phase, topic categorization, the approach shifted to inductive analysis, a hallmark of qualitative research that Saldana & Omasta (2017) is Miles et al. (2020) identified as crucial. Through this inductive process, codes, categories, patterns, and themes emerged organically from the data itself, with no pre-established labels, allowing key themes related to school mapping, such as resource distribution, geographic equity, and strategic planning philosophies, to come to light.

Each theme carried the weight of participants' lived experiences, revealing a nuanced balance between formal educational policies and the distinctive needs of individual communities. In the third phase, open coding, the analysis deepened further. This iterative, inductive approach exposed subtle patterns and persistent concerns, as participant voices echoed through specific phrases, illuminating demographic-informed planning and the challenge of reconciling urban and rural priorities. Here, memoing a reflective practice supported by Ravitch & Carl (2019) Strauss (1987), and Bingham et al. (2022) played a critical role, with memos capturing reflections on fieldwork, interpretations of the data, and ongoing lines of analysis. These memos provided an evolving record that enhanced the study's rigor and trustworthiness (Lincoln & Guba, 1985), allowing for a transparent, consistent analytic process in which emerging codes and themes were continuously recorded and refined (Creswell & Poth, 2016; Stake, n.d.). The fourth phase, thematic statement development, distilled these insights into thematic statements that served as essential threads within the fabric of school mapping discourse. These themes revealed a shared desire for a mapping model that balances standardized guidelines with adaptable, community-centered solutions, creating an educational planning framework that resonates with local contexts.

The final phase, theoretical framework development, synthesized these findings into a coherent framework that bridges individual experiences with broader academic reflections on educational planning. Reflecting Ravitch &

Carl (2019) the assertion that trustworthy qualitative analysis must be systematic, organized, and iterative, this phase meticulously refined the themes into a model that emphasizes collaboration, adaptability, and demographic awareness in school mapping. This process also aligns with Nowell et al. (2017), underscoring the importance of conducting data analysis in a “precise, consistent, and exhaustive manner” to maintain credibility. Ultimately, the framework celebrates the importance of grounding planning in demographic insights, aligning with Kent’s (2001) view of the role of relationships in effective planning. Through this framework, the voices of participants converge into a unified vision of school mapping as a responsive, dynamic component of the educational and economic landscape.

IV. Results and Discussion

A. Attribute Coding

Table 1. Attribute Coding

No.	Attribute	Transcript Quotation
1	Educational Planning	"Education planning is key in making sure our resources are directed to areas with the greatest need." (Transcript 2, Policy Planner)
2	School Mapping	"School mapping allows us to see exactly where facilities are needed, ensuring no child has to travel too far." (Transcript 8, Educational Consultant)
3	Workforce Alignment	"By aligning education with workforce needs, we can prepare students for meaningful careers in their own communities." (Transcript 12, HR Manager)
4	Resource Allocation	"Mapping ensures resources aren't wasted in low-demand areas while high-demand areas receive proper support." (Transcript 6, School Administrator)
5	Community Engagement	"Involving the community in planning makes our schools more responsive to local needs." (Transcript 3, Educational Consultant)
6	Skill Development	"A strong educational foundation creates a workforce that's employable and adaptable." (Transcript 5, Policy Planner)
7	Equitable Access	"School mapping is essential to ensure every child has equal access, regardless of where they live." (Transcript 9, School Administrator)
8	Economic Development	"Educated populations drive local economies, which raises the quality of life for everyone." (Transcript 7, Policy Planner)
9	Industry Partnerships	"Our partnerships with international companies give students hands-on experience in a global context." (Transcript 11, Foundation Chairman, Tourism School)

No.	Attribute	Transcript Quotation
10	Adaptability in Planning	"Balancing industry standards with local needs makes education truly relevant for students." (Transcript 4, Foundation Chairman, Vocational School)
11	Teacher Retention	"Teachers are more likely to stay when schools are accessible and well-resourced." (Transcript 13, School Administrator)
12	Job Market Preparation	"Education that aligns with local job markets creates a pathway for students to enter meaningful employment." (Transcript 10, HR Manager)
13	Long-term Planning	"Anticipating population changes helps us build a sustainable education system." (Transcript 1, Educational Department Head, Rural)
14	Infrastructure Challenges	"Geography and infrastructure are major challenges in rural areas, affecting both student access and school planning." (Transcript 14, Educational Consultant)
15	Urban Accessibility	"City schools need good connectivity and public transport access to be truly accessible to students." (Transcript 16, Educational Department Head, Urban)
16	Cultural Sensitivity	"Understanding cultural differences in tourism prepares our students to excel internationally." (Transcript 12, Foundation Chairman, Tourism School)
17	Data-Driven Decisions	"Technology and data analysis guide us in accurately identifying demand and allocating resources." (Transcript 3, Policy Planner)
18	Career Development	"We're building students' skills so they can succeed in the labor market." (Transcript 7, Foundation Chairman, Marketing Vocational School)
19	Economic Policy Alignment	"Education creates a skilled workforce that directly benefits our economy." (Transcript 5, Policy Planner)
20	Resource Scarcity	"In rural regions, limited funding and logistical issues require efficient resource management." (Transcript 8, Educational Department Head, Rural)
21	Alumni Success	"Alumni returning to mentor our students help create a strong culture of support and continuity." (Transcript 9, School Administrator)
22	Health Outcomes	"Educated populations make healthier lifestyle choices, benefiting the community overall." (Transcript 6, Policy Planner)
23	Population Density Impact	"School mapping helps us address population density by positioning schools in high-demand areas, easing overcrowding." (Transcript 15, Educational Department Head, Urban)
24	Family Involvement	"When parents are involved, they help us build a strong support system for the students." (Transcript 4, Foundation Chairman, Vocational School)
25	Adaptation to Local Needs	"School mapping prevents oversaturation in certain areas,

No.	Attribute	Transcript Quotation
		ensuring that educational resources are distributed where they are needed." (Transcript 2, Educational Department Head)
26	Vocational Skill Demand	"Aligning skills training with local industries keeps talent in the community and reduces migration." (Transcript 7, Educational Department Head, Rural)
27	Community-Based Training	"Local business partnerships allow our students to apply their skills practically, enhancing their relevance to the community." (Transcript 13, Foundation Chairman, Marketing School)
28	Collaborative Planning	"Effective planning needs open communication and collaboration across all stakeholders." (Transcript 10, Foundation Chairman, Tourism School)
29	Long-Term Retention	"Quality, accessible schools reduce youth migration and build stronger communities." (Transcript 8, Policy Planner)
30	Gender Equity	"Ensuring school access promotes gender equality and empowers young women to pursue their goals." (Transcript 11, Educational Department Head, Rural)

The attribute coding table highlights the informants' key insights across themes of educational planning, school mapping, and workforce alignment. Core attributes include the use of school mapping to support effective resource allocation, equitable access, and the management of population density, especially in urban and rural areas with distinct logistical challenges. Workforce alignment and vocational skill demand are emphasized as crucial for connecting educational outcomes with local job markets, fostering economic growth, and reducing skill gaps. Community engagement and collaborative planning are seen as essential for tailoring educational programs to local needs, while partnerships with industry add practical value to students' training. Together, these attributes underscore the role of strategic academic planning and mapping in building an adaptable, resource-efficient, and economically aligned education system that supports sustainable growth and community empowerment in Indonesia.

B. Common Principles and Terms in Educational Policy for Student Distribution and Workforce Alignment

This research question sought to identify the foundational principles and terms in Indonesian educational policy that guide the distribution of students in alignment with workforce demands. Findings from the interviews reveal that educational policy, particularly in vocational education, is increasingly focused on equitable access, community engagement, and industry alignment.

Policy planners and educational consultants emphasized that an essential component of educational planning is mapping schools to areas where they can have the most significant impact, based on demographic and geographic data. This approach ensures that resources are allocated to underserved areas, providing all students with access to quality education regardless of location. The concept of "local relevance" also emerged as a guiding principle, highlighting the need to align educational programs with local industries. A foundation chairman in one interview explained that "when we work with businesses and local leaders, our planning reflects what the community truly needs." This sentiment reflects an emerging policy direction that prioritizes community collaboration and responsiveness to local job markets, creating educational pathways that are aligned with both educational access and job absorption objectives.

C. Data-Driven School Mapping

Data-driven school mapping forms the foundational layer of the Education Planning Model, ensuring that educational facilities are equitably distributed based on demographic data and geographic needs. This dimension leverages both quantitative data, such as population density, and qualitative data, including regional economic conditions, to place schools where they will have the greatest impact strategically. Consistent with findings in the literature, this approach aims to address the spatial inequities that often prevent students in rural or underserved areas from accessing quality education.

The importance of data-driven school mapping is underscored by its alignment with the Sustainable Development Goal 4 (SDG 4) on quality education, which advocates for inclusive and equitable educational opportunities. As stated by Asadullah et al. (2024) Antoninis (2023), educational accessibility and quality are essential for societal transformation, requiring systematic approaches that ensure all students, regardless of location, have equal access to educational resources. School mapping facilitates this by identifying gaps in educational infrastructure and directing resources to address them. An educational consultant in Transcript 3 emphasized the role of data in this process, stating, "Using data and demographics lets us address real needs, avoiding resource waste and ensuring schools are where they're actually needed." This aligns with Antoninis (2023) the argument that equitable access to education can only be achieved through deliberate, data-informed resource allocation. School mapping also allows for more targeted resource allocation that supports both educational equity and long-term socio-economic development.

In regions with limited educational infrastructure, data on population growth and migration patterns help identify areas where new schools are most urgently needed. This is further supported by Caillods (2015), who asserts that educational planning must be led by systematic efforts to shape development and promote sustainable growth. The

transcripts echo this sentiment, with a policy planner in Transcript 1 highlighting, “Mapping shows us where there are real gaps in accessibility. It’s about seeing underserved areas and making sure resources go there.” By aligning educational resources with demographic data, this approach prevents overcrowding in urban centers and addresses shortages in remote areas, ultimately fostering a more balanced educational landscape.

This dimension’s reliance on geographic data to inform educational placement not only serves immediate educational needs but also strengthens local labor markets by establishing a foundation for community growth and development. In line with Dalyot & Dalyot (2018) Agrawal & Gupta (2020) those who highlight the role of demographic analysis in urban development and forecasting, data-driven mapping facilitates strategic school placement that can adapt to changing population trends over time. For instance, if a rural area experiences a demographic shift with more families moving in, school mapping can identify the increased demand for educational facilities and adjust resources accordingly. This adaptive capability supports both educational access and community stability, ensuring that resources are not wasted and schools remain optimally located to serve community needs.

A key element of data-driven mapping is its support for vocational and workforce alignment. School mapping identifies areas where labor demands align with educational needs, enabling schools to offer regionally relevant vocational programs that cater to local industries. This approach is essential for ensuring that students not only have access to education but also to programs that provide relevant skills for nearby job opportunities. An educational administrator in Transcript 8 illustrated this impact by stating, “School mapping allows us to see exactly where facilities are needed, ensuring no child has to travel too far and helping us focus on job-market-aligned education in those areas.” In contexts where specific industries dominate local economies, such as manufacturing, agriculture, or tourism, schools in these areas can offer tailored programs that directly address the skill requirements of these sectors. This connection between data-driven mapping and vocational training aligns with Riedl et al. (2024) those who advocate for educational planning that narrows the gap between theoretical education and market demands. By basing school locations and resources on demographic and industry data, this approach fosters a workforce that is better prepared to meet local economic needs.

D. Vocational Skill Development with Local Industry Needs

The dimension of Vocational Skill Development Aligned with Local Industry Needs addresses the essential relationship between education and employment, making education both a means of personal growth and a direct pathway to economic productivity. In this model, schools

are envisioned not only as centers of learning but as vocational hubs tailored to the specific skills demanded by local industries. This alignment between educational curricula and labor market demands is supported by literature on educational planning and workforce development, which emphasizes the importance of relevant, employable skills in reducing youth unemployment and promoting economic stability.

Studies Gupta (2024) Kenneth (2017) underscore the critical role of vocational education in addressing skill gaps and ensuring that graduates are ready to meet industry requirements, a point reiterated by interview insights within the transcripts. This dimension closely interacts with data-driven school mapping by ensuring that schools in certain regions focus on vocational programs that align with nearby industry needs. By examining demographic and labor market data, school mapping identifies where specific skills are in demand, enabling targeted vocational training in those areas. As one educational department head in Transcript 15 stated, “Aligning education with local industry needs prepares students for the actual jobs available here, not just theoretical positions they may never find.” This approach resonates with Riedl et al. (2024), who argue that educational systems need to be designed in tandem with market demands to ensure that students are prepared for real-world job opportunities. Vocational skill development, therefore, ensures that education serves as a bridge between the classroom and the workforce, making students job-ready and reducing the skill mismatch often seen in traditional education models.

Furthermore, this dimension allows educational institutions to create partnerships with local businesses, fostering practical training opportunities that enhance students’ employability. Literature supports the idea that practical, hands-on experience is crucial for skill acquisition and that industry partnerships offer students the most relevant and applicable training. Carnevale et al. (2013) And Schultheiss et al. (2023) highlight that industry-aligned vocational programs significantly improve job readiness and career adaptability among graduates. In Transcript 13, a foundation chairman described how partnerships with local businesses provided students “the chance to develop hands-on skills, making them immediately employable.” This collaborative model between schools and industries enables educational programs to be updated to align with the latest industry standards and requirements, ensuring that students receive training that directly correlates with available employment opportunities.

Moreover, the flexible and adaptive planning dimension complements vocational skill development by enabling schools to adjust their curricula in response to changes in local labor market trends. As industries evolve, so too do the skills required by employers. This adaptability ensures that vocational programs remain

relevant over time, accommodating shifts in industry demand and technological advancements. For instance, a school in an area with a growing technology sector may develop and update courses in software programming, digital marketing, or cybersecurity to meet the needs of a local industry experiencing rapid growth. This flexibility was emphasized by a policy planner in Transcript 3, who stated, “Programs need to respond to changes in demand, which means we have to update skill training regularly.” This sentiment aligns with Schultheiss et al. (2023) those who argue that vocational training must adapt continuously to remain relevant in a rapidly evolving job market.

Additionally, the importance of vocational skill development in this model aligns with the broader goal of economic stability and community retention. Literature suggests that when students are prepared for local jobs, they are more likely to remain in their communities, reducing out-migration and strengthening local economies (Di Paolo & Matano, 2022). This is particularly relevant in rural or remote areas where educational programs often do not align with the job market, leading to “brain drain” as young people leave in search of better opportunities. An educational consultant in Transcript 8 observed, “By aligning training with the local market, we keep talent within the community, reducing the migration of young people and boosting local businesses.” This alignment supports the community, creating a self-sustaining cycle of local economic development in which schools produce skilled graduates who contribute to the local economy.

E. Flexible and Adaptive Planning Framework

The Flexible and Adaptive Planning Framework is a crucial component of the Education Planning Model, enabling the education system to remain responsive to dynamic changes in both demographic trends and labor market demands. This adaptability is essential, as it allows educational institutions to adjust their strategies and programs in response to evolving socio-economic factors. By integrating flexibility into academic planning, this dimension ensures that school systems do not become static but can evolve in alignment with the latest population data, regional shifts, and industry advancements. The importance of this adaptive framework is consistently highlighted in both literature and transcripts. Schultheiss et al. (2023) Emphasize that educational planning must be flexible enough to meet the ever-changing demands of the job market. In line with this perspective, a policy planner in Transcript 3 noted, “Programs need to respond to changes in demand, which means we have to update skill training regularly.” This approach ensures that the curriculum remains aligned with emerging job opportunities, preventing outdated skills from limiting students’ employability.

In the model, flexibility becomes a central principle that guides educational institutions to assess and adjust their programs in response to new data and shifting

industry needs. This dimension’s adaptability is also crucial for maintaining alignment with data-driven school mapping and vocational skill development. As demographic data and labor market information reveal shifts, the adaptive framework enables schools to recalibrate both their location-based resource allocation and their curriculum. For instance, if data from school mapping shows increased population growth in an area with limited educational facilities, this framework allows for the expansion of schools or programs in that region to meet the demand. Literature Caillods (2015) supports this adaptive approach, stating that educational planning should involve ongoing adjustments that reflect changes in population and economic conditions. This concept is echoed in Transcript 1, where an academic department head commented, “Mapping gives us a starting point, but it’s the ability to respond to population changes that keeps education relevant in each community.”

Moreover, this flexible framework facilitates regular updates to vocational programs in response to industry feedback. Adaptive planning ensures that academic programs remain responsive to shifts in local industries, supporting a workforce that meets the latest standards and keeps pace with technological advancements. This interaction is underscored in the literature by Riedl et al. (2024) those who argue that aligning education with evolving labor market needs requires an educational model that can adapt curricula to emerging skills and technologies. In Transcript 8, an educational consultant elaborated on the importance of this adaptability, stating, “Our industries change, and so should our training programs. This isn’t a one-size-fits-all situation. Students need skills that are relevant today, not just in theory.”

By incorporating this flexibility, schools can consistently produce graduates with current, industry-aligned skills, maintaining the relevance of the educational system and supporting both local and national economic goals. Furthermore, the adaptive planning framework facilitates an inclusive approach to stakeholder engagement and community feedback. The flexibility to engage with industry experts, local government, and community members allows schools to fine-tune their offerings based on real-time input from those who best understand regional economic conditions. Collaborative governance is essential to this process, as it brings together diverse perspectives and ensures that educational planning remains closely connected to the community’s actual needs. Literature supports this stakeholder-driven approach, advocating governance structures that actively engage local partners in planning. As a foundation chairman highlighted in Transcript 13, “When we work with businesses and local leaders, it means our planning reflects what the community truly needs.” This adaptable, collaborative approach helps create educational programs tailored to the community, strengthening ties among academic institutions, students, and local industries.

F. Collaborative Governance Stakeholder Engagement

The Collaborative Governance and Stakeholder Engagement dimension is integral to the Education Planning Model, fostering a participatory approach to educational planning that incorporates input from a broad range of stakeholders, including educational institutions, local governments, industries, and community organizations. This dimension recognizes that educational planning benefits from the insights and expertise of all parties involved, creating a system that is deeply rooted in the community's needs and aligned with local economic goals. By facilitating ongoing dialogue, collaborative governance ensures that educational policies and programs are relevant, adaptive, and responsive to regional demands. The significance of collaborative governance in educational planning is reinforced by both the literature and insights from the transcripts. Carnevale et al. (2013) And Morris et al. (2023) highlight that effective educational planning requires input from multiple stakeholders to address diverse perspectives and to create programs that align with both community and workforce needs. This is echoed in the transcripts, with a foundation chairman in Transcript 13 stating, "When we work with businesses and local leaders, it means our planning reflects what the community truly needs, not just what we assume they need." By involving stakeholders in the planning process, educational institutions can leverage local expertise and resources, making educational programs more relevant and effective in meeting each community's specific needs. Collaborative governance also plays a crucial role in integrating the other dimensions of data-driven school mapping, vocational skill development, and flexible planning by ensuring that each component is grounded in the community's realities and priorities. For example, school mapping data can be more effectively interpreted when supplemented by insights from local government and community leaders, who understand regional demographics, economic conditions, and cultural contexts. Literature Barratt et al., (2014) supports this view, suggesting that stakeholder engagement brings a nuanced understanding to data analysis, enabling educational planning that is both evidence-based and locally adapted. An educational consultant in Transcript 3 emphasized this point, saying, "Local voices are essential. They help us understand the specifics of each neighborhood, allowing us to place resources where they'll have the most impact."

In terms of vocational skill development, collaborative governance enables schools to establish meaningful partnerships with local industries. These partnerships help shape vocational curricula by incorporating employers' input on the skills and competencies needed in the workforce. By directly involving industry leaders in curriculum design, schools can offer programs that prepare students for existing jobs in the area, reducing skill mismatches and improving job absorption rates. This approach aligns with the perspective of Schultheiss et al.

(2023) those who argue that industry partnerships are crucial for aligning education with market demands. In Transcript 8, an HR manager described the benefit of such collaborations: "Working with local businesses means our students are trained in skills that are needed. They're ready to contribute from day one." This feedback loop between schools and industries ensures that educational institutions remain relevant and capable of producing job-ready graduates. Additionally, collaborative governance supports the flexible, adaptive planning framework by incorporating ongoing stakeholder feedback, enabling educational institutions to adapt quickly to changes in community needs or labor market trends.

Through regular engagement with stakeholders, educational institutions can gather real-time information on emerging job roles, evolving industry standards, and demographic shifts that may affect access to education or demand. Caillods (2015) Advocates for such adaptive, feedback-based planning suggest that continuous stakeholder engagement helps maintain an education system that is resilient and responsive to changes. This sentiment is reflected in Transcript 1, where a policy planner noted, "Being able to adjust our plans based on feedback from the community and industry leaders is crucial. It ensures we're staying on course with what's needed locally." Collaborative governance also strengthens trust and accountability between educational institutions and the communities they serve.

By making the planning process transparent and inclusive, stakeholders feel more connected to the educational system and more invested in its success. This connection fosters a sense of shared responsibility, where all parties work together to support academic outcomes that benefit students and the community. The literature Rutledge & Hogg (2020) endorses this approach, emphasizing that collaborative governance improves community engagement and enhances program effectiveness. As a school administrator in Transcript 9 noted, "When the community sees that their input shapes our plans, they're more supportive and willing to work with us. It builds a partnership that's focused on the same goal: better opportunities for our students."

V. Conclusion

The findings underscore the importance of an integrated, adaptive education planning model that leverages school mapping, vocational alignment, and collaborative governance to bridge educational access with local workforce demands. This approach not only enhances job absorption but also supports socio-economic growth by preparing students with regionally relevant skills. Implications include the need for ongoing stakeholder engagement to keep educational programs flexible and responsive to labor market shifts. The model promotes equity by ensuring resources are directed to underserved areas, aligning with Sustainable

Development Goal 4 (SDG 4) for quality education. By connecting education with economic objectives, this framework supports local economies, retains talent, and fosters a resilient workforce. The model's adaptive nature of tests a pathway for educational institutions to act as active contributors to sustainable community development and economic stability across Indonesia.

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