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# The Role of Teacher in Industry 5.0, Technology, and Social Capital in for Vocational High School Graduates in School To Work Transitions

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**Abstract**

The large number of graduates who lack the skills needed for the workplace makes it difficult for them to find employment. This study aims to analyze the influence of teachers, technology, and social capital in preparing vocational school graduates for their first jobs. Participants came from five districts in Yogyakarta, including state and private VHS with engineering expertise, including 25 teachers and 99 students. The research steps involve conducting literature reviews, focus group discussions, and data collection via questionnaires. The results show that: (1) the stability of choosing a career that is in line with their education for graduates who study further is better than graduates who work or are entrepreneurs; (2) the measurement model showed valid and reliable results: outer loading (0.702 -0.967), AVE ≥ 0.5, Cronbach's alpha ≥ 0.7, Fornell-Larcker criterion, and HTMT ratio. The structural model using the SRMR is 0.078 (good fit); (3) With p-value 0.000 (sig < 0.05), there is direct significant influence between TCR -> TGR (f2 0.897), TCR -> SCR (f2 0.638) with large effect, and TCR -> STWT (f2 0.310), TGR -> STWT (f2 0.189), SCR -> STWT (f2 0.267) with medium effect and the indirect influence (TCR -> STWT), which is mediated by TGR and SCR. The role of the teacher (TCR) has a significant impact on optimizing the role of technology (TGR) and social capital (SCR) in the STWT effectivity. The role of teachers, technology, and social capital all have significant and medium effects on the STWT smoothness. This is in line with the concept of Industry 5.0, specifically integration. Education in the Industry 5.0 era is dependent not just on the contributors' roles but also on integration.



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## INTRODUCTION

As technology advances and job demands change, educational institutions must adapt, especially Vocational High Schools (VHS) which are considered to produce work-ready graduates. Technological disruption has had a significant impact on a variety of sectors. Many industries that once relied on human labor have now been superseded by technology. This also impacts the workforce, as the industrial automation system has resulted in numerous layoffs. These developments necessitate new learning approaches that may strategically prepare VHS graduates to succeed in the labor market. VHS is part of TVET (Technical and Vocational Education and Training). In essence, TVET tries to ensure that students gain the knowledge and skills that can assist them to be workforce-ready, to pursue higher education, to be self-employed, and to become employers through creating employment opportunities [1]. Vocational education is education that focuses on developing a person's vocation so that they can

be assigned or given orders to perform work or hold specific jobs [2]. Several worldwide issues in TVET include the gap between what students learn in school and what employers need [3]–[5], a lack of beneficial engagement between educational institutions and employers [3], [6], and the percentage of unemployed among educated individuals continues to rise [7]–[10]. These factors have the potential to influence graduates' school-to-work transition (STWT) stage.

The transition pathways are direct employment (school to full-time job), further training and education [11]–[13]; vocational training [12], [13], internship, gap years [12]. Higher education can be beneficial due to smoother STWT, better early career results, and higher earnings levels [14]. Vocational training assists graduates with enhancing their employability skills, making a faster transition to the labor market, and having higher-quality work since it is relevant to the training, job stability, and higher wages; Vocational training necessitates industry collaboration, career advice, and personalized learning [15]. Graduates also use the transition phase to take up temporary jobs. A precarious job ruins professional achievement by raising financial stress and reducing occupational self-efficacy [16]. Another consideration is rumination as a repetitious thought associated with depressive mood through the transition period, such as abstract-analytic thought (e.g. "Why did I fail to get hired at my previous job assessment?") and concrete-experiential thought (e.g. "At the previous job assessment, my qualifications might not have been effectively expressed to the recruiter.") [17], [18]. Due to being jobless or underemployed or job instability, many young people face a prolonged transition to secure stable jobs [19], [20]. Effects of extended transitions include prolonged reliance on family for emotional and financial support and delayed milestones such as monetary independence, stable housing, and establishing long-term relationships [20]. Non-adaptive transitions can have a detrimental impact on an individual's future orientation, boost their current concentration on current concerns and survival, social exclusion, behavioral issues, emotional pain, and psychological problems [20]. Numerous rejections and protracted unemployment cause people to quit looking for jobs, resulting in "discouraged workers" [21]. A comprehensive investigation of the STWT period is necessary to mitigate numerous unfavorable aspects of its duration.

The duration of the STWT varies that influenced by labor market policies, educational systems and economic conditions [22]. VHS graduates go through the transitions, during which they establish-change aspirations, and face real challenges and problems like as unemployment [23]. The pathways influenced by economic volatility, labor market needs, and education-job requirement mismatches [20]; Individual preferences, education background, social status, education opportunities, workplace situation. Several factors influence the transition from education to employment, including economic situations, educational systems, workforce demands, and government regulations [24]. Young adults are influenced by a variety of psychological, social, and economic issues when they transition from school to work [5]. Young individuals encounter psychological obstacles such as identity formation, self-efficacy, and career aspirations. Emotional anticipation is a variety of emotions students encounter in the STWT, including feelings of optimism, enthusiasm, fear, and anxiety [25]. The transitional phase might influence mental wellness, as anxiety and stress are prevalent among new employees. Social interactions, such as those with family, peers, and instructors, as well as the impact of their socioeconomic position on access to school and work prospects, are critical in assisting young adults during the change. The state of the economy and labor market circumstances have a significant influence on the STWT, including chances for employment, stability at work, and income rates.

Several things may be achieved to help graduates traverse the transition from school to work, including strengthening the role of teacher and responding to advances in technology [3]. Aligning educational curriculum with current and potential workforce requirements is vital [3]. Students expected training that fit their skills, passions, and future career goals. Graduates, on the other hand, go through a pinballing phase, which is described as an intensity of mobility due to rising uncertainty and precarity in the youth job market [26] as a result of a shortage of high-quality careers in the actual labor market that fit their aspirations [27]. Creating programs that combine practical skills, industrial knowledge, and soft skills in academic instruction. However, the learning process carried out in vocational schools still tends to focus on vocational technical skills, whereas being accepted into the workplace does not only require technical skills. Furthermore, the workplace demands people to be proficient in soft skills [3], [24], [28]–[31]. Ethics and moral principles are fundamental to 21st-century learning, as are learning and innovation skills including critical thinking, creativity, communication, and collaborative abilities [32]. As a result, Industry 4.0 (automation) is being transformed into Industry 5.0 (ethical collaboration).

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Industry 4.0 emphasizes automation and efficiency via networked systems and data exchange. Industry 5.0 is a paradigm shift focusing on interactive collaboration between humans and advanced technology such as artificial intelligence (AI), blockchain, robotics, the Internet of Things (IoT), and augmented/virtual reality (AR/VR) to achieve more personalized and integrated processes [33]–[36]. Industry 5.0's key aspects include a human-centric approach collaboratively with sophisticated technologies; sustainable practices, and individualized products through precise utilization of resources; and the need for ethical and social responsibility in technology use [34]. Industry 5.0 prepares students to be creative and collaborate with technological advances to create sustainable and innovative solutions. Teachers can enhance their roles by adopting the industry 5.0 concept.

Aside from teachers, various factors influence learning outcomes in the classroom in this era of digital transformation, particularly technology and social capital. Three distinct technological changes in the workplace including remote working, automated processes, and computational management [37]. Social capital influences learning outcomes [38]–[40]. Tolerance in digital society must be strengthened by the utilization of various social capital in social online activity [41]. In the digital transformation era, technology will influence teaching and learning [42], [43]. Furthermore, online platforms have an impact on job-hunting and recruitment [44], [45]. Access to digital resources and competency in digital skills became key indicators of effective transitions as remote jobs and digital hiring processes became increasingly prevalent [46]. A person can receive workplace information based on his preferences using internet job search tools. This ensures that a person's career is solid from the beginning and that the STWT proceeds smoothly. Therefore, the classroom at VHS requires the development of a learning environment that includes teachers, technology, and other social capital for VHS graduates to have job technical competence as well as soft skills. This study will investigate the role of the VHS teacher, the technologies used, and the social capital that led to the successful STW transition. The inquiry was guided specifically by this analytical purposes: (1) to examine the role of VHS educators, technology, and social capital in STWT; and (2) to construct a conceptual model for the comprehensive components on successful STWT.

## METHODS

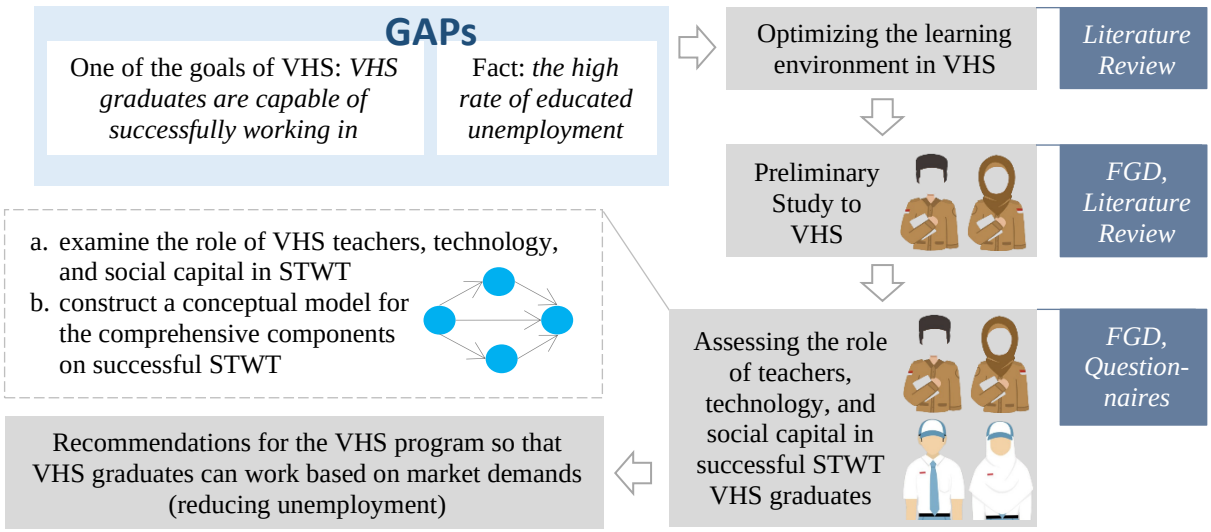


Figure 1. Research Framework (picture from [49], [50])

Participants came from five districts in Yogyakarta, including state and private VHS with engineering expertise include 25 teachers and 99 students. To ensure anonymity and confidentiality, participants submit informed approval. Figure 1 shows that this research started from the gap between graduates' work readiness and high unemployment which led to efforts to optimize the learning environment at VHS. A simple literature review was carried out to reveal the latest developments in STWT challenges and programs. The inquiry findings are employed in the preliminary study. This stage aims to narrow down the variables studied according to the urgency of current problems in VHS. The investigation was carried out by holding focus group discussions (FGD) with teachers. The results indicate the need to further assess Teacher's role (TCR), Technology's Role (TGR), and Social Capital's

Role (SCR) in actual current VHS learning to support STWT program (STWT). The next step is to conduct a systematic literature review (SLR) using prisma flow diagrams [47] to identify the definitions and indicators of these three variables. Thematic analysis was used in this review. Thematic analysis [48] helps identify common themes and patterns in successful STWT, including challenges, programs, and the roles of teachers, technology, and social capital. After identifying the indicators, a questionnaire was constructed.

The questionnaire consists of closed statements and open questions. Closed statements were utilized to assess the conceptual model, while open questions and earlier FGD results were used to reveal the findings in depth. The questionnaire's validity was assessed by expert judgment. The second FGD intends to reveal TCR, TGR, and SCR in actual current VHS learning to support STWT programs based on VHS teachers' perceptions, in addition to testing the questionnaire. Questionnaires that have been previously tested are then assessed for reliability. Valid and reliable questionnaires were distributed online to VHS students. The questionnaire developed uses 4 answer choices and open-ended fields. Figure 2 depicts the conceptual model and hypotheses. According to the proposed conceptual model, TcR has a direct positive influence on TgR, SCR, and STWT; TgR influences STWT; SCR influences STWT; and TcR has an indirect positive influence on STWT. SmartPLS version 4.1 was used to assess the proposed conceptual model. The triangulation method was used for open-ended results. Qualitative data from participant responses to the questionnaire were confirmed by the results of the first FGD, relevant studies and in-depth discussions.

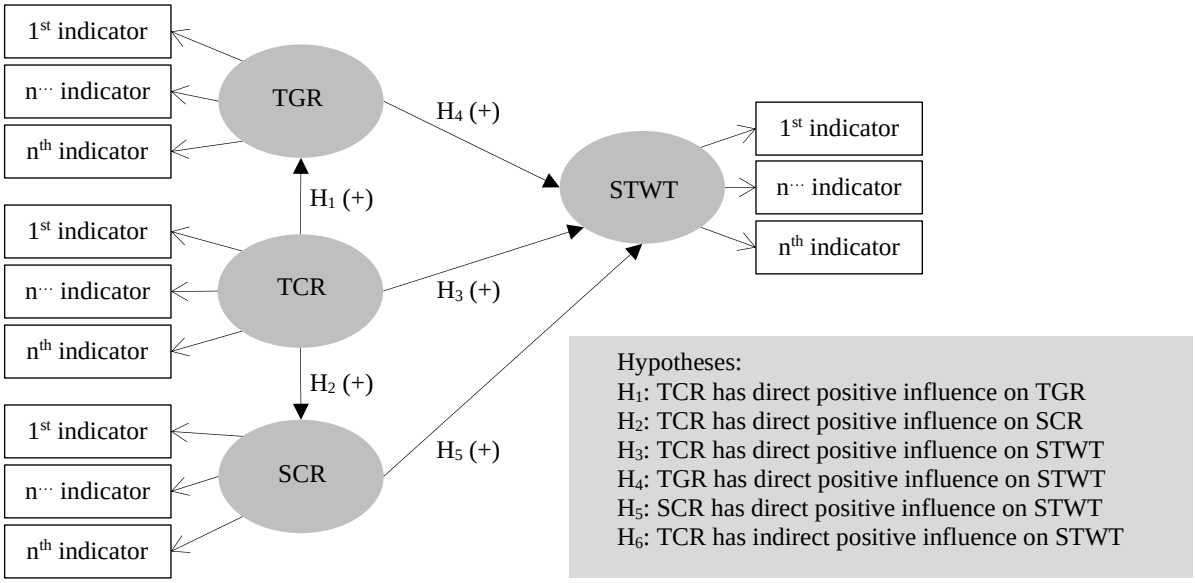


Figure 2. Proposed conceptual model and hypotheses

## RESULT AND DISCUSSION

### *The Role of Teacher in Industry 5.0 for STWT effectivity*

A brief literature review was carried out, including (1) STWT challenges and programs; and (2) the role of teacher in Industry 5.0. The analysis was sourced from the Scopus database, which covered the years 2022-2024. The keywords within the article's title for the teacher's role are "industry 5.0" AND teacher OR educator. The keywords within the article's title for STWT are "challenges" OR "programs" AND "school to work transition". There were each five literature on the teacher's role [33], [35], [51]–[53] and on the STWT [23], [54]–[57]. Furthermore, by searching the search site, additional articles were obtained.

In Industry 5.0, incorporating AI into education can address vocational education and training challenges. Teachers ensure that AI supports, not replaces, the human qualities vital to education [35]. Leveraging AI in education may enhance curriculum quality and student outcomes. Benefit optimization integration AI in teaching and learning including up-to-date material, as well as efficient and accurate rapid data processing; improve engagement with interactive material and real-time feedback; personalized learning adapts students' learning paths based on their strength and weaknesses,

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focusing on building specific competencies relevant to future career [35], [58]; ensure student's digital literacy, including ethical use and digital citizenship [58]. Utilization of AI in teaching are to identify key skills and curriculum framework that allign with industry needs and academic standards [35]; to plan learning activities [58] or curricula [59]; analysis teaching strategies [58], [59]. Data interpretation and decision making using AI were utilized in administrative task manager [58] that reduce tecaher's workload [59]. Teacher's development with AI integration support continuous and adaptable growth in capacity and self-confidence [58]. Community (school events, parent associations, professional learning communities) and collaboration using AI in education ease of accessing a learning environment for problem solving, sharing perspectives, and achieving collaborative goals [58]. Limitations before integration AI in education are standardized approach, which may not adaptive with labor demands changes; limited use in basic technology skills (internet and basic computer skills); lack of personalization; feedback to students and teachers' professional development occurs regularly, so it is not adaptable to changes and gaps in continuous learning [58]. Table 1 shows changes in the role of teachers in Industry 5.0.

Table 1. Changes in Teacher Roles in Industry 5.0 (AI Integration)

| Aspects | Before Industry 5.0 | After Industry 5.0 |
|---|---|---|
| Curriculum, Teaching and Learning (CTL) | Main role in content delivery, standardized teaching approach, limited resources, manual assessment, administer assignments manually [58] | Facilitator for guiding and mentoring through student personalized learning [33], [35], [51]–[53], [58], [59]; Automatic assessment and feedback [58]; curriculum designer with AI, enhancer of student interaction [33], [35], [52], innovative practices [33], [52], critical thinking promoter [51], adaptor: capable of adapting interactive and relevant approaches to teaching [35]; supporter of collaborative project learning [51], [52], enhancer of language proficiency [52], creator of inclusive learning environment [52], promoter of sustainable practices [53], developer of soft skills, cultural sensitivity and global awareness, connect to real-world application [53] |
| Technology literacy (TCL) | Teachs basic technology integration and basic digital literacy [58] | Integrator of AI technology, data-driver decision maker, ethical gurdian/ guide [33], [35], [51]–[53], [58]; developer of AI literacy, monitoring usage and evaluating impact AI in education [51], developer of digital competency [52] |
| Career guidance (CG) | Guidance is based on personal experience and general understanding, so may not be suitable for students needs [58] | Embrace technology integration to stay updated and professional development, guidance based on AI analysis results [35], [58]; Emphasis on building competencies, utilizing AI for individualized career pathways, linking up and collaboration, enhancing soft skills, promoting AI with ethics use, remaining industry-relevant, and analyzing emergent roles [35], mentor for career development [53] |
| Teacher's development (TD) | In-person workshop, peer colaboration [58] | Lifelong/ continuous learner [35], [51]–[53]; the usage of online training, resource sharing [58]; continuous capacity growth associated with AI technologies, ethics in applying AI, data-driven decision making; engaged partnership and networking [35], ethical and responsible educator, innovator and adaptable leader [53] |
| Community, collaboration (COM) | In-person face to face meeting [58] | Real-time AI-driven communication, virtual meeting, worldwide networking, virtual study group, discussion forum [58]; collaborating with stakeholder/ global connection [33], [52] |

There are three STWT outcomes: ultimate, intermediate, and system outcomes [60]. The final outcomes are related to the final results obtained by graduates in the workplace as an indicator of the success of STWT. STWT's final results include early employment, competitive income, acknowledgment of academic achievement/literacy/job market skills, economic independence, and affluence. The intermediate outcomes are the intended accomplishments before obtaining the final outcomes. Intermediate targets include improved academic achievement, literacy, interest in working/continuing studies/entrepreneurship, the deployment of work-based learning and tech-prep programs, skill certification/work readiness; and changes in parents' perceptions toward STWT. System outcomes are program services in educational institutions for preparing effective STWT. There are three types of challenges: personal, institutional, and structural [23]. Personal challenges, such as socio-economic status, career awareness, academic achievement, private networks, and mental health issues. Mental health issues including stress, anxiety, lack of adaptability [23]; low clarity, low acceptance,

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depression [61]. Institutional challenges such as the educational structure, limitations in career counseling, varying standards for training programs, financing inequities, lack of coordination, and inadequate teacher's professional development all have a bearing on the STWT's effectiveness. Dual education and early career tracking may enhance a person's career stability. However, these things may impede students who change their job intentions later (career inflexibility) [23]. Structural challenges affecting the STWT include job demands, regional variations, policy disparities, social inequity, educational structure, and integration issues. In general, the findings in a brief literature review were used for the first FGD, including STWT perception and STWT challenges such as high unemployment, skill gaps, inadequate career service, insufficient teacher's training, inflexibility and unequal educational system, technological changes, financial constraints, socioeconomic disparities. Table 2 outlines the challenges and problems in vocational education and training.

Table 2 shows that the challenges in vocational education and training can be narrowed down to three research variables (TCR, TGR, and SCR). These challenges are technically adjusted according to their suitability to the concepts in these three variables. Teachers are in the forefront of assisting graduates during the successful STWT phase, play a multifaceted role. Teachers' utilization of collaboration in Industry 5.0 includes not only the use of cutting-edge technology but also working alongside social capital networks in addressing existing problems. Various existing constraints can be minimized by optimizing teachers' roles, but other challenges remain in solution exploration from the perspective of what teachers can do. For example, to address the issue of rising unemployment, teachers focus on assisting students in mastering skills based on industry demand. Teachers must have up-to-date technical literacy and be able to communicate persuasively with a network of connected stakeholders.

The first FGD, as an initial inquiry, revealed that: (1) STWT: VHS graduates are not immediately accepted into the workplace, even if they have previously had industrial practice at that location; graduates still have a waiting period until they finally work/continue their studies/become entrepreneurs; there is no intensive assistance after graduating into the workplace; (2) graduate acceptance: some graduates work/continue their studies/enterprises in industries that do not align with the skills program at VHS; several VHS graduates remain unemployed; (3) teachers do not pursue WBL optimally due to insufficient resources and partnerships; (4) work-related learning (work-oriented, work-connected, work-integrated): teachers regard administrative duties quite burdensome, resulting in teacher reluctance to assist students master the latest sk ills needed for their jobs, lack of access and time to improve personal competencies, lack of time to create meaningful career-related interactions with all students; (5) policy differences amongst VHSs lead to variances in graduation quality. In Yogyakarta, there is a State VHS with expertise in tourism that has agreed to partner with the company on the job recruitment process. In this VHS, career tracing is carried out at the beginning of the school year (class X), which impacts on industrial practices (internships) that relevant the student's career interests. When graduating, graduates can be accepted in the industry where they do their internship. Unfortunately, a new issue arose in which parents were hesitant to allow their children to work for the company because they had to leave Yogyakarta; (6) VHS students vary in mental maturity, motivation, and self-confidence in their career competencies; (7) students have different technological literacy, and the usage of current technology in industry does not line up with the availability of technology in schools; digital technology has not been used to its full potential for information search, job search, or capacity building; (8) career guidance is separately charged to career guidance teachers only; (9) skills learning activities lack optimal interaction between students, teachers, equipment and real world conditions; (10) coordination of partnerships between schools and industry differs for each school; (11) lack of access to scholarships; (12) infrastructure gap; regional disparities; (13) the need for a policy that can fit the needs of the effectiveness STWT program.

Table 2. Optimizing the roles of teacher, technology and social capital role in STWT challenges and programs

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| Challenges* | Roles | Programs |
|---|---|---|
| High youth unemployment, limited options for employment, unstable workforce, rigid labor market [55]; economic fluctuation [23], [62], skills demand [23]; Low-demand fields of study [63] | *CTL* | Labor market reforms, economic policy [14]; Job creation programs [19]; support for At-Risk youth [11]; youth guarantee, dual education, youth employment [55]; workplace training [23], [60]; internships, apprenticeships [3], [5], [23], [55]; |
| Lack of employer/ industry engagement/ collaboration [3], [23], [54], [56]* | *CTL*, TGR, SCR | partnerships [3], [4], [6], [63], [64]; tech-prep with employers [60]; curriculum allignment [20], [62], [63], industry project [48]; hiring practices [65] |
| Skill gaps [3], [4], [19], [55], [64], [66]; insufficient soft skills [3], [57], [64]; communication problems [67]; cultural adaptation [54], [57]; lower academic achievements [23], employability [68]; workplace culture [69]; global competencies [62] | *CTL*, TGR, SCR | Solving skills gaps in integrated learning [3], [4], [60], skill standardization, certification system [60]; orientation programs [54]; community and family support [57]; WBL [3], [70], work placement learning [68]; student reflection [68]; practical experience [25], significant learning events, capstone projects, project-based learning, co-op programs and industry-sponsored projects [71]; work integrated learning, collaboration platforms, joint reserach initiatives [72]; |
| Limited access to work-based learning (WBL) [3]* | *CTL* | flexible learning paths [48] |
| Educational attainment [46]* | *CTL* | Physical health initiatives in schools [13] |
| Physical health gaps [13]* | *CTL* | Integrating emotional preparation in curriculum [25]; mental health services [21], [46]: motivational program [21]; mental health preventive measures [20]; career guidance and counseling [3]–[5], [11], [23], [54]–[56], [60], [68]; job placement [5], [11], [20], [21], [54], [55], [64]; time management training [6]; job coaching [6], [56]; mentorship [54]–[56], [63], [73], [74]; graduate course placement [60]; transition agreements [56], [60]; graduate tracking [48]; personalized counseling [65] |
| Inadequate career services [3]; mismatches between current job experiences with academic career preparation [66]; lack of career awareness, personalization, motivation, confidence, mentorship, and access to professional networks [23] | *CG*, TGR, SCR | |
| Psychological and emotional gaps [13], [23], [54], [61]; emotional anticipation [25]* | *CTL*, SCR | |
| Insufficient teacher's training [23], [56]; heavy workloads, inadequate assistance [23] | *TD*, TGR | Teacher training and development, capacity building [56] |
| Inflexibility of early tracking [23]; limited/ unequal resource allocation [23], [55], [56] | *COM* | Modernizes vocational training [32], |
| Technological changes (access, resource) [3], [23], technological advancements (new job opportunities requires new skill sets) [62]; global competition and mobility [3], [62] | *TCL*, TGR | Enhancing digital education: curriculum integration, teacher training; improving digital infrastructure: public-private partnership [75]; digital skill training [62] |
| Financial constraints [3], [23], [54], [57]; limited access to resources [23] | *COM*, SCR | Scholarships [6], [54], [55], [63]; paid internships [6], [76]; policies related to economic background [23] |
| Socioeconomic and geographic location disparities: inequality of economic, access, infrastructures, resources [11], [21], [23], [55], [77]; ethnic disparities [78], [79] | *COM*, SCR | Job security policy [13]; Policy changes [6], [56]; curriculum reform [64]; Inclusive policy [56], [62], [78], policy coordination between educational and labor market and addressing inequalities [12]; |
| Policy and regulatory barriers [3], [23], [56]* | *COM* | Ensuring equitable allocation of resources [63], [65], |
| Social inequity: disability discrimination [56]; gender discrimination [5], [23], [69]; limites social mobility [23]* | *COM*, SCR | [78], teacher professional development to enhance the quality of education in all regions, Multi-Stakeholder Collaboration [78], digital inclusion initiatives, subsidized acces [75] |
| Parents' social networks disparities [80]; varies in family background, cultural expectations [62]; Social networks gaps [80]* | *COM*, TGR, SCR | community program, mentorship, anti-discrimination policies, awareness campaigns [80]; parental involvement program, resource provision [81]; profesional networking [63]; |
| Individual preferences [12], [82]; willingness to compromise [83]; protean career orientation and proactive career behaviors [84]; self-efficacy, resilience, proactive personality [85]; emotional intelligence profiles [65]; academic agency [70] | *CTL* | on-the-job training (OJT), mentorship [82], career guidance [82], [83]; incorporating protean orientation, proactive behaviours training [84]; career counseling, skill development program [85] support for lower attainers [70] |

*Note: * indicates additions after the first FGD and SLR; teacher's role is represented by CTL, TCL, CG, TD, COM*

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***The Indicators of TCR, TGR, SCR on STWT effectivity***

Based on the first FGD findings, the STWT program at VHS was investigated further, with a focus on concerns to be deemed essential and could be solved, including (1) strive for various roles of teachers to face STWT challenges; (2) optimizing technologies can be utilized on lack of partnership coordination, skill gaps, inadequate career services, insufficient teacher's training, technological changes, and parents' social networks gaps; and (3) maximizing the use of social capital associated with social ties in STWT. A systematic literature review was then conducted to further explore the concepts and indicators of these four FGD result variables. Figure 3 depicts the prism flow diagram from this article's systematic literature review. The analysis was sourced from the Scopus database, which covered the years 2022-2024. The keywords within the article's title is "school to work transition". There were 46 articles reviewed [11]–[17], [19]–[22], [25], [27], [46], [48], [54], [55], [61]–[65], [68]–[72], [74]–[92]. Additional articles were obtained from searches on websites and citations of articles for additional information regarding teacher's role, technology, and social capital related to STWT.

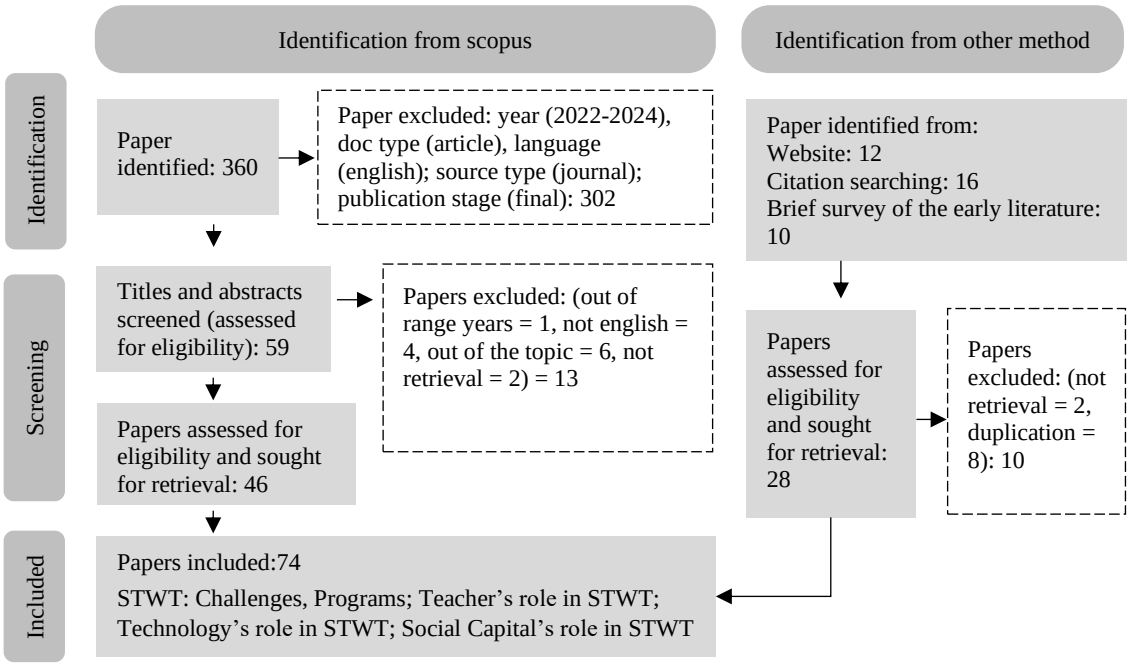


Figure 3. Prisma Flow Diagram in this article

Successful transitions, defined by secure and excellent employment, are related to increased life satisfaction and mental health [11]. The STWT is a vital stage for subjective well-being that positive influence by employment stability, job satisfaction, work conditions, and career prospects; unemployment or underemployment during the transition period correlates to decreased well-being and increased anxiety and stress [11]. Decreased well-being can be caused by job dissatisfaction that influenced by larger aspiration-attainment gaps [63]. Program for facilitating transitions including vocational preparation schemes and entry-level qualifications, mentoring, coaching, customized training that address individual needs and learning paces; work-based learning; employer involvement; policy for funding, coordination and long-term support [92]. Indicators for vocational training effectiveness include increased employability skills and personal development [92]. STWT outcomes are employment status (job stability, salary, and career progression), job satisfaction and well-being; skill development for long-term career success and adaptability [12]. Improving transition results requires better career coaching, more flexible and practical education alternatives, and dealing with inequality in society [12].

Teacher have an important role in delivering more than knowledge and expertise transfer. Teachers must prioritize both "teacher doing" and "teacher being." Teacher doing refers to a teacher's activity related to teaching strategies, while teacher being emphasizes teachers' characteristics, especially developing interactions helping students feel comfortable, as well as becoming supportive in a variety of circumstances [93]. An educator/teacher/lecturer/coach/ instructor or other similar term must not only be a technical expert in a specific field of expertise, but they must also be able to establish

positive relationships with students in addition to teaching methods. teachers must possess a professional attitude as well as an awareness of the stages of transition and the forthcoming job market. By optimizing the teacher's role, the STWT process is expected to accelerate. The teacher's role is to ensure that VHS students and graduates have career information, skills, and are ready for employment.

Teacher's role including interact with students, comprehend their viewpoints, and successfully organize classrooms [94]; promoting employability activities (internship, work expereience, extracurrcular that develop soft skills and provide networking opportunities, improving academic satisfaction [91]; Work placements are practical work experiences included in educational courses that enable students to use theorized concepts in real-life exposure, giving important hands-on experience, strengthening skills, and enhancing job readiness [68]. Apart from understanding theoretical and practical skills, teachers must integrate a variety of skills into their instruction. Protean career orientation and proactive professional practices must be learned by students. Protean career orientation is a self-driven strategy for managing careers that helps individuals accept the responsibility for developing their careers and adapt to dynamic settings, characterized by self-awareness, adaptability, and focusing on their values and purposes [84]. Proactive professional behaviors include having the initiative in career planning, defining career objectives, searching out opportunities, soliciting feedback, networking, and actively enhancing abilities [84]. Autonomy support proved as vital for developing a belief in self-determination and delivering beneficial outcomes [82]. Teachers can activate the role of peers in learning. Peer support groups allow students to communicate their experiences and replicate effective tactics [25]. Positive feedback and encouragement from peer boost optimism, motivation, and career success; Positive peer appraisals are associated with more aggressive job-seeking activity and better employment results, such as obtaining desirable jobs and higher starting salaries [90].

Significant learning events are vital activities that help an individual advance professionally and prepare for the job market, include internships, capstone projects, industry collaborations, professional networking, and mentorship [71]. Career competencies such as self-awareness, career exploration, career decision-making, and networking are influenced by employability activities, such as internships, part-time jobs, and extracurricular involvement, becouse provide practical experience, help build professional networks, and improve job search skills [91]. Teachers need to ensure students have high academic satisfaction. This is because high academic satisfaction leads to greater motivation and engagement in both academic and career-related activities [91]. Unpaid job experiences and internships are an issue for those who are less well off, both of these contribute to an extra point in the employer's judgment [76]. Teachers can look for partnerships that can provide pain internships.

Technology is utilized for career information and job searches to reduce STWT time. Technology is primarily used to job search [15], [65], [88], awareness campaigns [80], [89], and digital skills workshops [75]. Another use is to improve student capacity and seek career-related information. Some general procedures that graduates do during the job search process: (1) identify specific industries/workplaces and job responsibilities by analyzing the field of expertise that was studied [95], [96]; and (2) the usage of numerous online media for job searching, including social networks [64], [76], [86]; social networking websites [97], [98], company website [98], professional networking platforms [75], [99], online job portals [75]; job search assistance [22], online application systems, email and online communication, online portofolio and private website, as well as job search application in celluler. In today's job market, using internet platforms for job searches is critical [98], [100]. A digital platform diminishes the likelihood of finding jobs and influences young graduates' views on career opportunities [44]. There is a digital disparity in online job hunts, which is influenced by numerous factors, including sociodemographic features, online experiences, social media use, and stronger digital work search abilities [45]. The benefits of social networks in STWT include information on job vacancies, company culture, and industry expectations [86]. The advantages of graduates who actively use STWT-related social networks are faster job search results [86]. Visiting business events, joining professional groups, and taking advantage of online platforms [86] are all examples of beneficial networking behavior. Graduates who strategically used their networks had an easier transition into work and more promising career paths [86]. VHS graduates need to have the ability to identify careers and workplaces and continue to explore career opportunities through digital platform technology. Teacher's role in TCL aspect close to technology's role. Teachers encourage students to utilize technology for skill development and career adaptability while also ensuring students use technology appropriately and ethically.

Several things that teacher can do related to CG and COM aspect, such as mentorship [12]; coaching [89]; robust career guidance and counseling services in schools [76] and career services [63]. Industrial partnerships provide numerous advantages, such as access to expertise in the field (industry exposure), cutting-edge technology, and practical uses of concepts in theory [48]. This makes graduates easier to hire by increasing employment rates and job matching, as well as improving graduates' workforce readiness, resulting in being more adaptive and productive from early on. The components for successful partnerships are reciprocal advantages, continual interaction, and the use of a feedback system [48]. Industry Projects are empowering students to take part in industrial-sponsored projects and contests that allow them to use their skills in actual situations. Industry partnerships in graduate workplace preparation promote employability and job readiness by offering hands-on experience, industrial-relevant capabilities, and regular curriculum adjustments. Encouraging and deepening these partnerships using supporting regulations, allocation of resources, and engagement may significantly enhance technical education graduates' STWT [48].

Mentors provide advice, encouragement, and introductions for prospective jobs [86]; creating personalized transition plans based on each each student's specific strengths, interests, and needs of that involve input from students, parents, educators, and employers [56]. Mentoring show improved labor market orientation, develop more realistic career expectations; mentoring does not lead to diminished career ambitions but rather facilitates a smoother transition into higher-paying jobs [74]. Mentorship that link students to professionals in the industry can lead to greater job possibilities [63]. Mentorship provides support and guidance customized to students' emotional needs, boosting optimism and lowering anxiety [25]. Coaching that assists students in identifying goals, helps them through the activities they perform to accomplish these objectives, and encourages critical inquiry [89]. Coaching attributes include effective communication, emotional intelligence and empathy, planning and goal-setting, problem-solving, motivation, and encouragement; Coaching programs can increase students' career readiness and continuous employability [89], enhanced self-awareness, skill development, mantain motivation and accountability [84].

Enhancing career services to offer comprehensive support in resume conferences, interview preparation, and social gatherings with companies that value foreign experience [54]; job search strategies, resume building, and interview preparation [71]. Access to beneficial career assistance and counseling throughout education contributes to developing appropriate career plans [63]. In addition, Early career counseling may assist students in making informed choices in their academic and career line, thus narrowing future disparities [63]. Career services offer practical career advice, assisting students in aligning their desired careers with achievable objectives [63]. Career services involve career advice and guidance, job search training, and chances for networking [25]. Teachers can give workshops about digital interview strategies [75]. There is a gap in access to professional social networks [76]. Teachers play a role in overcoming this gap through learning activities that combine with network access in industry.

Table 3 shows the indicators of the four variables in this study. The interaction represents social capital, which is a learning experience that students need when interacting socially in the workplace. Social capital that promotes careers while students attend VHS for STWT effectiveness. Capital Social's role related to the utilization of community [56]–[58], [64], [80]; social support networks [20], [54]; support systems (family, friends, institutional) [11]; career services [12], [80], [91]; peer support network [13], [25], [85], [90]; parental social network [80]; mentorship [25], [80]; workplace support [13]; parental proffesional network [81]; faculty supervisor support [68]; social networks [46]; on the job training [82]; and family, mentor [85]. Faculty supervisors assist students in evaluating their experiences, and establishing career targets, as well as professional networks to increase their awareness of strengths and areas for enhancement, and to boost their overall performance [68]. Networks allow students exploring the labour market and graduates to contact with professional associations and participate in various self-development programs like internships and mentorships [81]. Solid professional networks may assist with better. [63]. Family social capital consists of financial, economic, information, and networks in work environments and communities that offer career guidance and job placement assistance [81]. Parents' active participation in the children's education and career preparation enhances the smoothness of the STWT [81]. Parents with economic stability and a higher level of education tend to have broader, more extensive, powerful, and resource-rich social networks. Native parents in the workplace can

provide insider information on the labor market and specific industry guidance, which may be critical for career strategy and choice-making [80].

Table 3. Indicators of the Variables

| No. | TCR | TGR | SCR | STWT |
|---|---|---|---|---|
| 1 | Mentorship for career development. | Identify careers, and workplaces, and explore career prospects. | Employer/ Industry partnership | Mastering information about career possibilities that align with the skills learned |
| 2 | Developing work-related skills, including culture | Investigate onsite training opportunities in industries | Professional community | Mastery of job-related understanding |
| 3 | Linking the latest real-world applications. | Skill development | Teacher/ Mentor | Having a career adaptability |
| 4 | Bridging networks and collaboration | Optimizing network behavior | Local government | Guided by a sustainable career mentor. |
| 5 | Supports collaborative project learning. | Ethical application of digital literacy and AI | Educational authorities. | Sustain a network. |
| 6 | Integrator of AI Technology | The use of social networks app/website. | Labor Bureau. | Understanding of workplace culture. |
| 7 | Promotes the ethical use of technology | Use of the Company Website | Alumni | Mastering employable skills. |
| 8 | Facilitator of digital literacy and AI. | The use of professional networking platforms | Family | Mastering global competencies |
| 9 | Emphasizes students' personalized learning. | The use of private websites | Peer | Have excellent academic performance. |
| 10 | Adapting engaging and relevant teaching strategies | The use of online job portals, job search assistance, and job search applications | School staff | Willingness to compromise. |
| 11 | Creator of inclusive learning environments. | The use of online tools to apply for jobs (CV, portfolio, and others) | Scholarship-granting institution | Mastery of digital literacy (AI). |

***The impact of TCR, TGR, and SCR on STWT effectivity***

Table 4. description of the participants' characteristic

| Description | Frequency | % |
|---|---|---|
| Gender | | |
| *Male* | 47 | 47 |
| *Female* | 52 | 53 |
| Graduation year | | |
| *2023* | 37 | 37 |
| *2022* | 33 | 33 |
| *2021* | 29 | 30 |
| Workplace/ further study location | | |
| *Yogyakarta* | 80 | 81 |
| *Outside of Yogyakarta* | 15 | 15 |
| Status | | |
| *Work* | 74 | 75 |
| *Further education.* | 16 | 16 |
| *Self-employed.* | 5 | 5 |
| *Not working, but looking for work.* | 3 | 3 |
| *Not yet possible to work* | 1 | 1 |

| Description | Frequency | % |
|---|---|---|
| Employment institutions | | |
| *Government agencies/ universities* | 12 | 12 |
| *Multilateral Institutions.* | 4 | 4 |
| *Non-profit organization.* | 0 | 0 |
| *Private companies/ universities* | 74 | 74 |
| *Own company* | 5 | 5 |
| The strong association between your education and your current work/ further study | | |
| *Very Close* | 20 | 21 |
| *Tightly* | 19 | 19 |
| *Quite Tight* | 4 | 4 |
| *Not Tightly* | 23 | 23 |
| *Not at all* | 26 | 26 |
| Getting a job post-graduation takes less than 6 months. | 29 | 29 |

Table 4 depicts participation characteristics. The 99 participants completed a questionnaire with 44 closed statements (each variable reflected in eleven questionnaire items) and four open questions. These 48 items form the measurement model, which measures four constructs. Each item reflects the variable's constructs. The questionnaire was constructed using the indicators outlined in Table 3. Graduates who work or continue their education mainly reside in Yogyakarta. This could be linked to the findings from the first FGD. Parents are

worried if their children leave them to work or study outside of Yogyakarta. Several graduates have yet to find work. In general, numerous graduates work or pursue education in the private sector. However, if we look further, 12% of state institutions are graduates who continue their studies. This implies that all graduates work in private companies. The choice of work or further education of graduates shows that the majority are unrelated to the fields studied in school. A deeper look reveals that a lot of persons who work and are entrepreneurs are unrelated to the disciplines studied in school. However, further analysis finds that most of them are related to the fields studied in school (13 very closely, 2 closely, and 1 less closely). Most graduates work in the service sector as cashiers or shop assistants, both in shops related to engineering and shops in the service sector such as minimarkets, cafes or working in factories. The choice of entrepreneurship is not in line with theory and practice at school, such as opening a culinary business for electronics engineering graduates. This indicates that the stability of choosing a career that is in line with their education for graduates who study further is better than graduates who work or are entrepreneurs. Many graduates have waited more than six months for a job. Some of these findings indicate that graduates had difficulties throughout their STWT phase. The conceptual model is then analysed.

Smart-PLS version 4.1.0.5 is utilized in this research to enhance the variance due to endogenous latent variables in the Partial Least Square-Structural Equation Modelling (PLS-SEM) technique [101] and assess the hypotheses of the proposed conceptual model. PLS-SEM results were obtained by assessing the measurement and structural models. The measurement model ensures that each item reflects the construct, whereas the structural model refers to the model's relationships. Analyze the measurement model to determine convergent validity (factor loadings and the AVE of the scales), discriminant validity (the Fornell–Larcker criterion and the cross-loading heterotrait-monotrait (HTMT) ratio) and reliability (Cronbach's alpha). Reliability refers to the consistency among the indicators (items) of a construct; Convergent validity refers to the extent to which the indicators of a construct converge or share a significant proportion of their variance; Discriminant validity reflects how different one construct is from another [102]. Analyze the structural model by examining model fit (one example is SRMR). The assessment begins by verifying if the constructs fulfil the requirements identified by the outer loadings. Table 5 and Table 6 show convergent validity, reliability and discriminant validity for assessing the measurement model.

Table 5. Convergent Validity and Reliability the Measurement Model

| **Variables** | **Outer loading** | **Average variance extracted (AVE)** | **Cronbach's alpha** | **Composite reliability (rho_a)** | **Interpretation** |
|---|---|---|---|---|---|
| | (Valid ≥ 0.7 [102]) | (Valid ≥ 0.5 [104]) | (Reliable ≥ 0.7 [105]) | | |
| SCR | 0.729 – 0.862 | 0.652 | 0.946 | 0.947 | Valid and reliable |
| STWT | 0.702 – 0.967 | 0.564 | 0.919 | 0.930 | Valid and reliable |
| TCR | 0.710 – 0.920 | 0.611 | 0.935 | 0.938 | Valid and reliable |
| TGR | 0.707 – 0.920 | 0.623 | 0.939 | 0.942 | Valid and reliable |

Table 6. Discriminant validity

| **Fornell-Larcker criterion** Above all zero order correlations in the rows and columns [106] | | | | | **Inter-pretation** |
|---|---|---|---|---|---|
| | SCR | STWT | TCR | TGR | |
| SCR | 0.833 | | | | |
| STWT | 0.802 | 0.912 | | | Valid |
| TCR | 0.624 | 0.781 | 0.848 | | |
| TGR | 0.747 | 0.815 | 0.688 | 0.854 | |

| **Heteroit-monotrait ratio (HTMT)** (Valid < 0.9 [107]) | | | | | **Inter-pretation** |
|---|---|---|---|---|---|
| | SCR | STWT | TCR | TGR | |
| SCR | | | | | |
| STWT | 0.827 | | | | Valid |
| TCR | 0.639 | 0.796 | | | |
| TGR | 0.774 | 0.839 | 0.711 | | |

The acquired results can be interpreted with valid and reliable results. The fit model using the SRMR is 0.078 (good fit < 0.08 [103]). Thus, the proposed conceptual model is in the good category. There are two influence correlations among the four variables, referred to as direct

and indirect influence. Path coefficient can be seen in Table 7. The direct influence is between TCR -> TGR, TCR -> SCR, TCR -> STWT, TGR -> STWT, SCR -> STWT. The indirect influence is TCR -> STWT (0.436), which is mediated by TGR and SCR, respectively by 0.218. The total effect of TCR's direct and indirect effects on STWT is 0.781. The hypothesis is tested by examining the positivity of the path coefficient value, significance with the T-value and p-value, and effect with f-squared. Each hypothesis is accepted. The role of the teacher (TCR) has a significant impact on optimizing the role of technology (TGR) and social capital (SCR) in the STWT effectivity. The role of teachers, technology, and social capital all have significant and medium effects on the STWT smoothness. This is in line with the concept of Industry 5.0, specifically integration. During the era of Industry 5.0, these findings must be followed by increased digital literacy efforts. Education in the Industry 5.0 era is dependent not just on the contributors' roles, but also on integration. Practically, interoperability, agility, and service orientation must be integrated through mutually beneficial multistakeholder collaboration.

Table 7. Hypothesis

| **Hypothesis** | **Path coefficient** | **T-value** (sig > 1.96) | **p-value** (sig < 0.05) | **f-squared** | **Effect of f-squared** (small: 0.02 – 0.15; medium: 0.16 – 0.35; large: > 0.35 [108]) | **Decision** |
|---|---|---|---|---|---|---|
| $H_1$ TCR -> TGR | 0.688 | 14.712 | 0.000 | 0.897 | Large | Accepted |
| $H_2$ TCR -> SCR | 0.624 | 10.712 | 0.000 | 0.638 | Large | Accepted |
| $H_3$ TCR -> STWT | 0.345 | 3.999 | 0.000 | 0.310 | Medium | Accepted |
| $H_4$ TGR -> STWT | 0.316 | 3.640 | 0.000 | 0.189 | Medium | Accepted |
| $H_5$ SCR -> STWT | 0.350 | 4.323 | 0.000 | 0.267 | Medium | Accepted |

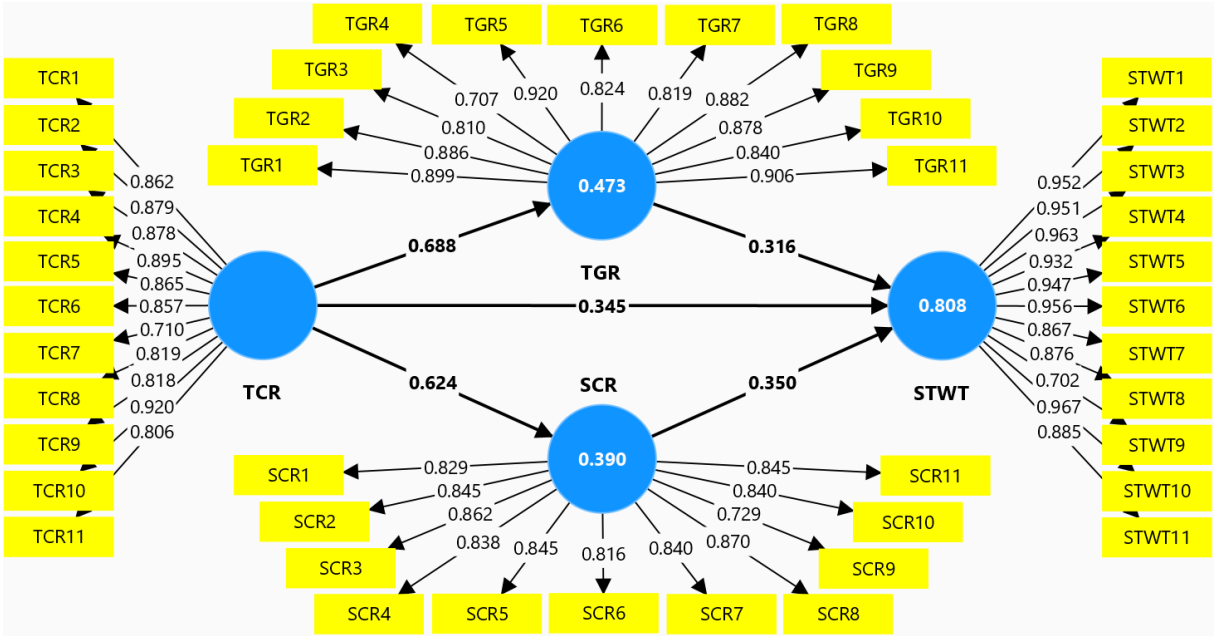


Figure 4. SEM diagram: structural model (path coefficient), measurement model (loading), constructs (R-square)

In-depth analysis involves examining the mean score of each construct item to identify the strengths and limitations of the current role of teachers, technology, and social capital in STWT. The analysis was carried out by examining the average score for each item besides the responses to the four open questions on the questionnaire. This analysis was performed using the data triangulation technique. The mean score results show that the role of the teacher has the highest mean value (3.45), followed by the role of technology (3.37), the role of social capital (3.18) and the success of STWT (2.83).

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Table 8. The respons of questtionaire (average score of each indicator and summary)

| No. Item | Closed statement response | | | |
|---|---|---|---|---|
| | TCR | TGR | SCR | STWT |
| 1 | 3.77 | 2.78 | 3.92 | 2.68 |
| 2 | 3.80 | 2.79 | 3.86 | 2.64 |
| 3 | 3.83 | 3.73 | 4.13 | 2.77 |
| 4 | 3.91 | 3.04 | 2.32 | 2.60 |
| 5 | 3.97 | 2.75 | 2.07 | 2.83 |
| 6 | 2.97 | 3.82 | 2.35 | 2.79 |
| 7 | 2.99 | 3.80 | 3.69 | 2.92 |
| 8 | 2.98 | 3.54 | 3.38 | 2.89 |
| 9 | 2.96 | 3.53 | 3.30 | 3.81 |
| 10 | 3.84 | 3.79 | 3.94 | 2.73 |
| 11 | 2.91 | 3.78 | 2.03 | 2.54 |
| Average | 3.45 | 3.37 | 3.18 | 2.83 |

| Item | Open-ended questions response |
|---|---|
| The most influential role of teacher in STWT | Providing learning, especially those having close ties with the workplace; holding personal discussions |
| The most significant type of digital technology and the use | Social networks such as Facebook provide a lot of information about job opportunities; opening websites of targeted companies/universities |
| The most significant aspect of social capital in STWT | Teachers and schools are the primary sources for finding work information; Graduates also contact internship places for job vacancies. |
| Work readiness, career maturity when graduation. | Not ready and confident to work; take available job opportunities even if they do not align with what is taught in school; changed jobs several times because due to discomfort. |

The success of STWT, which is still in the sufficient category, requires synergy from the three related roles. Some things that teachers have done well are developing a collaborative learning environment related to the workplace. This has an impact on the mastery of good academic achievement by graduates. Educators who connect theoretical understanding with real-world experience and emphasize vital soft skills considerably improve graduates' readiness for industry difficulties [31]. The learning is based on actual-world situations, case studies, as well as industry-relevant assignments, which promote critical thinking, problem-solving, and collaboration while also developing confidence and capabilities. Furthermore, educators with industry expertise were beneficial because they offered perspectives on present industry practices, demands, practical guidance, and mentorship. The curriculum for the Integrated Engineering Programme (IEP) emphasizing a multidisciplinary approach that integrates technical understanding with real-world expertise and soft skill development, including project-based learning, actual problem-solving, and potential for industry connection [29]. Regarding learning, what is considered lacking is inclusive learning related to the diversity of conditions and characteristics of teaching participants. Furthermore, teachers need to implement flexible learning, including dealing with changes in students' career aspirations during school. Greater program flexibility enables more personalized educational paths and the integration of actual job activities [15]. Implementing the reform required significant resources, including funding for updated curricula, training for educators, and support services for students. Ensuring the sustainability of the reforms posed a challenge, particularly in maintaining industry partnerships and continuous curriculum updates [15]. Higher career flexibility is linked with a smoother transition to work, which leads to improved job search approaches, increased employability, and earlier job placement [85].

Regarding learning, teachers need to integrate other relevant skills such as work culture and willingness to compromise. Teachers need to provide mentorship to students on an ongoing basis. As a result of filling in open questions, it was found that career guidance mentoring was mostly imposed on career guidance teachers. In fact, the number of career guidance teachers is top. Therefore, subject teachers in the classroom, especially those related to areas of expertise, need to collaborate regarding career mentoring. Specific workplace communication issues in STWT imply the need for a joint mentorship initiative with the employer that emphasizes workplace culture in the context of learning [30]. Interpersonal ties and soft skills are crucial in the smooth transition from engineering school to professional work. Mentoring programs enhance the STWT by offering guidance, practical counsel, emotional support, assistance in creating reasonable career goals, and networking opportunities [74]. Teachers can try to form

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partnerships with industry related to mentoring. Teachers must optimize integration in Industry 5.0 for students' career success. Stakeholders may design specific programs to help students achieve their career goals. Enhancing career services, managing inequality in society, matching education with labor market demands, and creating encouraging networks are all critical steps toward reducing the aspiration-attainment barrier and increasing career satisfaction and success [63].

Financial problems experienced by students need to be connected to the institution providing the scholarship. However, the results of the questionnaire show that the use of these institutions is involved in obtaining low scores. Students have not used all available opportunities for future success. Teachers still play a passive role in efforts to match students' scholarship needs with related institutions. Teachers have not yet become an integrated unit, they still separate their duties. The results of the first FGD show that there is a view that as a class teacher it is enough to provide class material, things such as career guidance, searching for scholarships are coordinated with the career guidance teacher or regarding student fitness issues which are part of assessments in the workplace, sports teachers experience difficulties because there are intervention from parents who object that their child is too tired. In fact, the fact is that physical fitness is part of the criteria for graduate acceptance. Many work sectors require workers to carry out monotonous physical activity for long periods of time. What also needs to be emphasized in filling out the questionnaire is related to AI literacy. Key determinants of Transition: Digital Access and Skills, Socioeconomic Status, Educational Attainment, Social Networks that influenced by government support, institutional adaptation, mental health support [46]. Therefore, currently digital literacy is something that must be learned and mastered by students at school. AI in Education (AIEd) is very useful. This has been included in the development plan for the Indonesian education sector. Teachers need to be able to function as AI in Education integrators and digital literacy developers.

***Recommendations for the VHS program***

Structural dynamics can produce NEET (Not in Education, Employment, or Training) [87]. It is hoped that a smooth STWT will be able to minimize the presence of NEET. Career optimism and adaptability have an impact on STWT [57]. A successful STWT will have improved employability, enhanced confidence, and independence, as well as social and economic inclusion [56]. Addressing these issues necessitates tailored support programs, improved psychological services, better alignment of education with labor market demands, and the establishment of solid social networks [20]. In general, the policy implications that can be implemented are: (1) Educational reforms: strengthening vocational training, curriculum alignment [22], national implementation, ensuring adequate funding and resources [15]; (2) Enhancing digital access: investment in technology, digital literacy programs [46]; (3) Targeted support for disadvantaged groups: financial aid and scholarships, inclusive career services [46]; (4) Strengthening social networks: mentorship program, community engagement [46]; (5) Supporting mental health: mental health resources, stress management programs [46], motivational program [21]; (6) Labor market policies: active labor market policies, employment flexibility [22]; (7) Strengthening industry collaboration: partnership models that can be replicated across different regions and sectors, establishing mechanism for continuous engagement with industry partners [15]; (8) Strengthening support services [21], [65]; (9) Employer engagement [65]; (10) Addressing socioeconomic disparities [65]; (11) Economic development: investment in job creation, supporting small and medium-sized enterprises (SMEs) [22]; (12) Cross-Country Learning:learn best practices and encouraging collaboration and knowledge sharing To link up actions to reduce youth unemployment while encouraging better transitions [22]; (13) Enhancing support services: career services (ongoing support, guidance, resources throughout education and job search), mentorship programs (professional guidance and networking opportunities) [15]; (14) Enhancing EI development: Educational program, training workshop, personalized counselling [65]; (15) Monitoring and Evaluation: regularly assessing the impact of vocational training programs to identify areas for

improvement and ensure they meet the evolving needs of the labor market; creating feedback loops between educators, students, and employers to continuously refine and enhance the vocational training programs [15]; (16) Regional economic development: investment in infrastructure, business incentives [21]; (17) VET: expanding access, alignment with market needs [21]; (18) Gender: encouraging diverse field of study choices, addressing occupational segregation, combating discrimination and bias [69]; (19) Feedback mechanism, monitoring and evaluation [71].

This research has limitations in that the research sample is still small, even though it has considered representation between private and public schools as well as representation from five districts in Yogyakarta. However, comprehensive efforts have been made, namely FGD activities by presenting teachers and obtaining many meaningful findings. Apart from that, the job characteristics of graduates are still global, not identifying whether graduates are full-time workers or part-time workers. Another limitation is not paying attention to the teacher's readiness in carrying out their role. Therefore, further research regarding teacher readiness in their role, including the role of technological readiness and social capital readiness, needs to be explored in more depth. This is closely related to the integration of technology such as AI in Industry 5.0. AI in Education needs to be welcomed with teacher readiness, technology and social capital support.

## CONCLUSION

AI in Education, especially entering industry 5.0, needs to start with awareness of wanting to integrate. The integration referred to is the integration of technology and all resources that can be used in a vocational education environment. Technology is not a substitute for teachers. The existence of technology exists because of quality humans. The key to educational success remains in humans. There needs to be awareness and readiness of teachers to be willing and able to become facilitators, integrators, developers of digital literacy and AI in education. This article explains the role of teachers in Industry 5.0, technology and social capital for STWT effectiveness. The results show that hard efforts from multi-stakeholders are still needed to overcome the various existing gaps. The principle is integration and mutually beneficial relationships. It is hoped that this research can be continued in a more strategic and technical direction that will have an impact felt by students and in the future can eliminate the contribution of VHS graduates as unemployed. VHS graduates are successful during STWT, whether working, continuing their studies or becoming entrepreneurs.

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