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**Julie Furst-Bowe
Editor**

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Even though space does not permit us to include the names of many others who contributed their valuable time and talent in service to the *Journal*, we do thank them as well. Since 1993, they have served as associate editors; co-editors; guest, style, copy, and managing editors; managing reviewers; members of the editorial board; regional editors; and publishers.

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**International Journal of Vocational
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Articles do not necessarily reflect the position or policy of the International Vocational Education and Training Association or the Journal's editorial staff, and no endorsement by the association or editorial staff should be inferred.

Contributors

Dr. John S. Gaal is currently an Adjunct Professor of Labor-Management Relations at Webster University in St. Louis, Missouri. Dr. Gaal was the Director of Training and Workforce Development for the St. Louis-Kansas City Carpenters Regional Council.

Dr. Douglas J Swanson is currently an Associate Extension Professor of Labor and Workforce Development and also serves as the Coordinator for the Labor Studies Program at the University of Missouri Extension—University of St. Louis Missouri.

Mathew Pezold is currently a Field Specialist in Labor and Workforce Development at the University of Missouri Extension in Jackson County—Kansas City, Missouri.

Dr. Eila Burns Ph.D. works as a Senior Researcher in the School of Professional Teacher Education at Jamk University of Applied Sciences, Jyväskylä, Finland.

Ms Susanna Kanninen works as an Administrative Planner in the School of Professional Teacher Education at Jamk University of Applied Sciences, Jyväskylä, Finland.

Dr. Akpomudjere Owiroro currently works with the Department of Business Education, College of Education, Warri, Delta State, Nigeria.

Kelechi Raymond Okoye currently works with the Department of Technology and Vocational Education, Nnamdi Azikiwe University, Anambra State, Nigeria.

Dr. Carsten Schmidtke is currently the Coordinator of the Applied Technology B.A.S. Program within the School of Leadership at The University of Southern Mississippi, Hattiesburg, Mississippi.

Message From the Editor

Thank you for taking the time to read the first and only issue of the 28th volume of the International Journal for Vocational Education and Training.

As I complete my first issue of the journal, I want to thank everyone who has helped to make this publication a success, including the authors, the editorial board and the IVETA officers. I also extend my appreciation to Dr. Luke Steinke, the previous editor, who agreed to continue managing the layout and design of this online journal and Ms. Olga Harrison, IVETA's International Business Development Director, who tirelessly promoted this journal throughout the entire year. It indeed takes an entire team of dedicated individuals to make this journal available to IVETA members and other individuals interested in the latest research and analysis in Technical Vocation Education and Training (TVET).

This publication, and this issue in particular, offer a truly global perspective on TVET. This issue features articles from five authors exploring various facets of TVET and its impact on both educators and learners. These articles include a study exploring the pedagogical digital competence of TVET instructors in multiple countries in Europe and a survey of the information processing skills of business instructors in Nigeria. In both of these articles, the impact of teachers' technology competence on learners, educators and the educational system is examined. There are two more articles from U.S. authors that you will be familiar with from previous issues. These include the third article in a series of research focused on exploring high school as a barrier to success in the construction industry and a study that demonstrates the need for mental health training in the construction industry. In addition, there is an article that discusses the advantages of and challenges associated with Regional Workforce Education Centers in the Germany. As you read this issue, some key themes are likely to emerge, including the global importance of TVET.

For anyone interested in serving as a reviewer for upcoming issues of the journal or looking to publish quality TVET research and analysis, please contact me at juliefurstbowe@gmail.com. I am happy to discuss an idea, review a first draft or provide other assistance as you develop your article.

Finally, for anyone who is interested in serving as a reviewer or an author for the new Spanish version of this journal, please contact Dr. Tulio Barrios Bulling at journals@iveta.com



Julie Furst-Bowe, Ed.D.

Editor—International Journal for Vocational Education and Training

MAKING A CASE FOR REQUIRING MENTAL HEALTH TRAINING IN THE CONSTRUCTION INDUSTRY: A PILOT STUDY

John S. Gaal

ABSTRACT

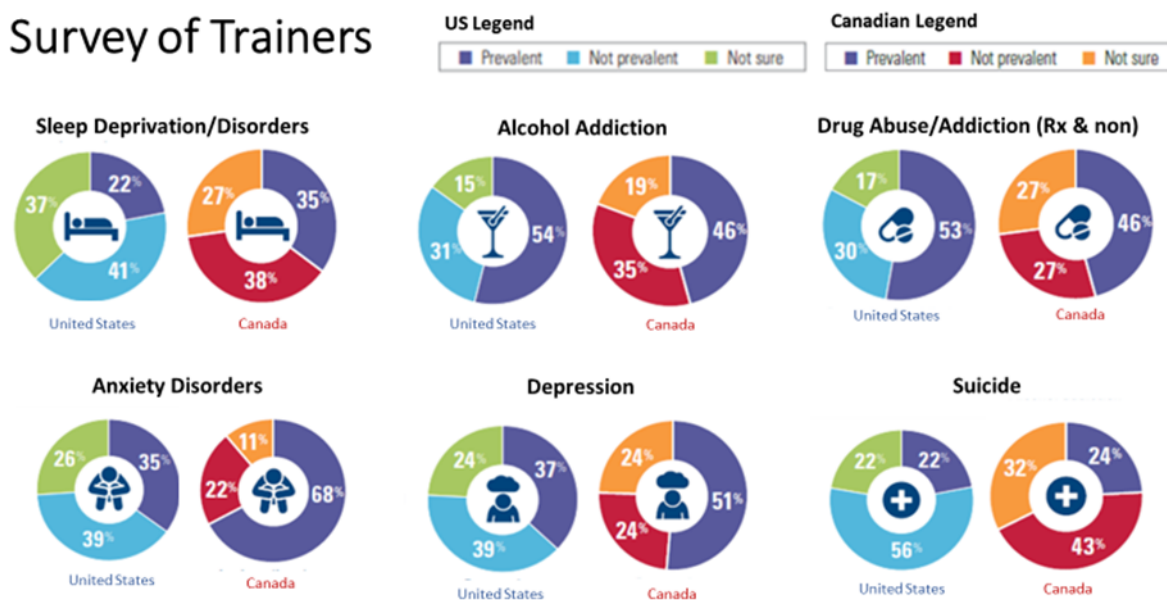
With the recent rise of mental health issues, including opioid misuse and suicide, in the United States construction industry, there is a need to design, develop, and implement a standardized primer course on this topic for pre-apprentices. This course will cover the basics of mental health, opioid awareness, and suicide prevention in the construction industry. Utilizing an existing presentation (Mental Health in the Construction Industry: Break the Silence—Stop the Stigma), this pilot study utilizes convenience sampling to examine and compare the anonymous polling results of an experimental group of diverse pre-apprentices with the polling results from a control group of seasoned human resource and safety professionals. A t-test for independent samples is utilized for statistical analysis. While no significant difference exists between these two groups, a closer look at the data reveals that learning gains from both groups (based on differences in pre-test and post-test scores) ranged from >60% to >270% following the intervention. A recommendation is made to enlist the support of various governmental bodies and industry associations/unions to take action now so today's pre-apprentices are prepared to become tomorrow's industry leaders. A list of related resources is provided for review.

Keywords: *mental health, opioid use, suicide, pre-apprentices, construction, US-DOL, OSHA, Focus-Four*

INTRODUCTION

Prior to COVID-19, this author began performing research on issues related to construction apprentices' wellness and well-being. In fact, two of these studies have been published in this journal (March 2021 and December 2022 issues). A major reason for pursuing this work was based on findings from the IFEBP's (International Foundation of Employee Benefit Plans) biannual survey of training staff and administrators across the United States and Canada. The 2020 results are displayed in Figure 1. NOTE: These results are based on the training staff's perceptions of their apprentices. For that reason, this author was moved to explore further by seeking input from the actual source, the apprentices.

Figure 1. 2020 survey results



Source: IFEBP (2020)

For decades, government bodies, management associations, and unions within the U.S. construction industry have recognized the importance of the physical aspects of safety (slips, falls, etc.). It is only within the past few years that many of these same organizations have started to fully acknowledge the importance of the mental aspects of safety (drug misuse, suicide, etc.), as noted above. According to research from the Centers for Disease Control and Prevention (CDC: Billock et al., 2023; Peterson et al., 2020), the construction industry ranks first relative to opioid misuse and second relative to suicide. For the past three years, variations of this information were shared by top-ranking officials at the U.S. Department of Labor's Occupational Safety and Health Administration (OSHA) (Frederick, 2021; Parker, 2022, 2023). Yet, little has been accomplished to ensure that these important topics are standardized and included in current pre-apprenticeship training programs and/or the existing OSHA-10 or OSHA-30 training courses.

In August 2022, the Center for Construction Research and Training, the research arm of the North America's Building Trades Unions (NABTU), invited approximately 60 thought leaders from across the nation to a two-day summit in Washington, DC, that addressed issues related to mental health, opioid awareness, and suicide prevention in the construction industry (CPWR, 2022a). At the event, this author proposed designing, developing, and implementing a short course for use in established pre-apprenticeship and safety training programs. It should be noted that NABTU has an educational arm that has produced and disseminated a pre-apprenticeship training curriculum known as MC3 (Multi-Craft Core Curriculum) that has been successfully used across the nation by a variety of pre-apprenticeship training providers. Further, it should be noted that for nearly 20 years OSHA has required that construction workers receive safety training. The gold standard for general industry and construction workers has been the OSHA-10 training course. Over the past decade, OSHA has placed a spotlight on four types of injuries/fatalities and requires that these topics be addressed in the training course. They are referred to as the Focus-Four: falls; caught-in or between; struck-by; and electrocution. A number of advocates of adding a mental health training requirement suggest that OSHA re-frame and rename the Focus-Four to Focus-Five.

LITERATURE REVIEW

Even before the COVID-19 pandemic began in early 2020, reports were appearing that indicated the mental health of people in the United States was declining. As noted below by one healthcare expert (Mastroianni, 2022, para 24):

A lack of access to care was a major problem prior to the pandemic and only became worse once the pandemic started and we saw rapidly increasing rates of mental health challenges among children and adolescents. The system was already overburdened, and the pandemic pushed it even further over the edge.

During COVID-19, regarding high school students, the CDC (2022, para 3) proclaims, "...that 37 percent of youth experienced poor mental health during COVID-19 and that 44 percent of youth experienced persistent feelings of sadness or hopelessness during the past 12 months." After COVID-19, with respect to adults, MHA (2022, p. 9) asserts, "21 percent of adults are experiencing mental illness" while 55 percent of those adults receive no treatment. In the words of the U.S. Surgeon General, Vivek Murthy, MD (2022, p. 4): The pandemic also sparked a reckoning among many workers who no longer feel that sacrificing their health, family, and communities for work is an acceptable trade-off. Organizations are also increasingly aware of another trade-off: when the mental health of workers suffers, so does workplace productivity, creativity, and retention.

More specific to the construction industry, CPWR (2022b, para 1) states "Mental health is a growing concern in the construction industry, including a disproportionately high suicide rate and rising overdose fatalities." More specifically, Dale et al (2021, para 4), cite "...that construction workers prescribed opioid for musculoskeletal pain had a higher risk for long-term opioid use and for developing opioid use disorder." Meanwhile, Peterson et al (2020, para 1)

declare "...suicide rates were significantly higher in five major industry groups..." with Construction (males) ranked second.

METHODOLOGY

Design of Study

The pilot study that follows is based on the polling results from a 60- to 90-minute presentation titled "Mental Health in the Construction Industry: Stop the Stigma – Break the Silence." Wherein, five polling questions were asked of the participants throughout this presentation (See Appendix A). The system for delivery and data collection for these questions was Slido, an online polling system. All responses were anonymous and not all participants responded to each question. In the context of a pre-test/intervention/post-test approach: (1) each question was asked and responded to prior to revealing the correct information; (2) following each polling question, the related factual information was discussed during the body of the presentation; and (3) at the end of the presentation, all five questions were asked again, in mixed order, in an attempt to gauge learning gains.

Sample Population and Demographics

The sample population was comprised of 82 individuals of which, on average, 69 fully participated (84 percent participation rate). The sample population was broken into two distinct groups: experimental and control.

The experimental group consisted of 57 individuals from four sub-groups of which 44 participated (77 percent participation rate) from four separate settings as explained below. The first sub-group was comprised of 20 pre-apprentice students, including 12 men and 8 women, in the St. Louis YouthBuild (YB) organization. Their ages ranged from 17 to 24 years old. All of them were African-Americans. Eleven of the 20 students participated (55 percent participation rate). This sub-group was polled on July 20, 2023.

The second sub-group was comprised of 15 pre-apprentice students, including 12 men and 3 women, in the St. Louis Building Union Diversity (BUD) organization. Their ages ranged from 18 to 42 years old. Eight of them were African-Americans, six were Caucasian, and one identified as Other. Thirteen of the 15 participated (87 percent participation rate). This sub-group was polled on July 27, 2023.

The third sub-group was comprised of 11 pre-apprentice students, including 8 men and 3 women, in the Local 562 Champions program (Champs). Their ages ranged from 20 to 47 years old. Eight of them were African-Americans, two were Caucasian, and one identified as Other. This subgroup had a 100 percent participation rate. This sub-group was polled on August 1, 2023.

The fourth sub-group was made up of nine pre-apprentice students, including 8 men and 1 woman, in the Springfield Apprentice Ready Program (ARP). Their ages ranged from 18 to 47 years old. Three of them were African-Americans, five were Caucasian, and one identified as Other. This subgroup also had a 100 percent participation rate. This sub-group was polled on August 21, 2023.

The control group was made up of 40 individuals of which 25 participated (63% participation rate) at the Illinois Manufacturing Excellence Center's (IMEC) Safe and Sound Conference. This group consisted of human resource and safety professionals from various industries (including construction). Their ages ranged from 23 to 63 years old, including 25 men and 15 women. One of them was African-American, 38 were Caucasian, and one identified as Other. In this group, 25 of the 40 participated (57 percent participation rate). This group was polled on August 9, 2023.

Data Collection and Analysis

As noted earlier, Slido (an online polling system) was utilized at each of the five locations mentioned above. Four of these locations were in-person presentations. The only virtual presentation performed was with the Apprentice Ready Program in Springfield. Once data were captured and downloaded, this author placed all raw data into MS Excel spreadsheets for data analysis purposes.

Figure 2 demonstrates that, in each setting, the intervention portion of the three-stage process assisted in improving scores from pre-test to post-test.

Figure 2.

Group	# Avg Response	Pre-test	Post-test	Difference	% Change
YB	11	248	409	161	64.92
BUD	13	240	466	226	94.17
Champs	11	117	433	316	270.09
ARP	9	173	392	219	126.59
IMEC	25	115	401	286	248.70

The score in each area was based on the sum of the percent of those responding to the correct answer from each audience setting. The difference is merely a subtraction of the sum of the pre-test scores from the post-test scores. The percent change was calculated as follows:

Post-test – Pre-test

$$\text{Pre-test} = y$$

$$y * 100 = \% \text{ Change}$$

It is important to note, as revealed in Figure 3, for purposes of calculating a mean, the scores from the experimental group were adjusted to reflect a weighted average. The raw data for these calculations can be located in Appendix B. Whereas, calculating the mean for the control group took a more direct approach.

Figure 3.

Q#	YB	BUD	Champs	ARP	IMEC
1	-10	34	24	41	14
2	30	32	73	21	51
3	22	21	64	42	43
4	64	77	100	78	82
5	55	62	55	37	96
TOTAL	161	226	316	219	286
W AVG	40.25	66.77	79.00	44.80	
Mean	>>>	>>>	>>>	57.70	57.2

Next, both data sets were analyzed using the t-test for independent samples. These results can be found in Appendix C. One will find that, upon comparison, there is no significant difference between the experimental and control groups. To this end, the groups did not vary in a statistical manner.

Discussion

More can be said about the data analysis in the section above. Now that one can see the results from the two groups, as well as the finer details of the four (experimental) sub-groups, some conclusions may be interpreted as:

1. Beyond the fact that a significant difference between these two groups was not established utilizing an inferential tool for statistical analysis, one should consider reviewing aspects of the percent change between the various groups. First and foremost, all groups increased their learning gains by more than 60 percent. In fact, Figure 2 above reveals that one of the four experimental sub-groups increased their understanding of the presentation materials by over 200 percent with the control group displaying similar results.
2. By making a comparison of a younger-skewing group of pre-apprentices entering the construction industry with that of seasoned human resource and safety

professionals from general industry, one finds that both groups experienced double to triple-digit learning gains. Two points may come to mind:

- a. one could deduce that a level of face validity exists; and
 - b. the subject matter covered connects to participants from each group, despite demographics.
3. Upon review of the raw data (Appendix B), one can see that the percent change in learning gains in the control group and the Champs (experimental) sub-group demonstrated the greatest increases (more than 200 percent). Since both of these groups reflect older age ranges, one might postulate that smaller gains were made in the other three experimental sub-groups (with younger participants) due to their first-order familiarity of the subject matter. Or, one might surmise that the control group and Champs (experimental) sub-group, due to maturity, may have had second- or third-order connection with the subject matter going in but substantially increased their knowledge base upon completion.
 4. With issues of mental health in today's workforce escalating in importance, the results of this pilot study should serve as an impetus for designing, developing, and implementing a standardized, required training session on this topic for inclusion in programs such as MC3 and OSHA-10 or OSHA-30.

CONCLUSION & RECOMMENDATIONS

Earlier this year, this author was interviewed by the "Voices of the Industry" reporter from the Civil Quarterly. This Dodge Construction Network magazine is viewed by many in the construction industry as a reliable source for national data on heavy-highway construction projects. Laquidara-Carr asked (2023, p. 41-42), "What are the top changes to the industry that you would like to see help address the mental health, opioid misuse, and suicide challenges?" The response, in brief, was:

1. utilize the OSHA-10 training model concept instituted over 20 years ago to blanket the entire industry with basic safety training;
2. partner with NABTU as mentioned in in the fourth discussion point above;
3. partner with OSHA as mentioned in fourth discussion point above;
4. partner with the US-DOL's Office of Apprenticeship to encourage them to mandate mental health training in their Registered Apprenticeship Program's training standards (29CFR29) as they currently do with safety and first aid;
5. recruit a corps of qualified workers to serve as field peer support navigators; and
6. begin to focus on the impact of traumatic brain injuries (recruits and incumbents).

In closing, it may behoove those parties who remain on the fence regarding this matter to seriously consider becoming more informed on the topics of mental health, opioids awareness, and suicide prevention in the workforce. As noted earlier, thousands of young people in the U.S. are struggling with these issues. Many of these individuals are the very people who will need to step up and take on leadership positions within the next decade. For this reason alone, this matter is vitally important and as such requires ongoing and additional education and support. There are a number of resources one can access for more information. Below are several recommendations worth viewing and sharing:

- We Need to Talk About Mental Health: This is a free seven-minute video that makes a case for all Americans to consider the importance of mental health in today's society. <https://www.youtube.com/watch?v=6YbWRqsnHdo&t=18s>
- U.S. Surgeon General's Framework for Workplace Mental Health & Well-being: This is a free two-minute video briefly explaining the five essential areas of focus. https://www.youtube.com/watch?v=2_iftFuTGDK
- Construction Worker Well-being & Risk Management: This is a free two-minute video that sheds light on how to empower workers while improving safety and productivity. <https://www.youtube.com/watch?v=P7rso-OIBIM>
- Overdose Prevention: We Can All Save a Life: This is a free seven-minute video that provides concise information on helping someone dealing opioid use disorder. <https://www.youtube.com/watch?v=misAs9xKO8s>
- CIASP & Living Works: This is a free 90-minute interactive virtual tutorial on suicide prevention in the workplace. <https://preventconstructionsuicide.com/Training>
- CPWR's Preventing Suicide in the Construction Industry: This is a free one-hour webinar on approaches to help stem the tide of suicides in the US construction industry. https://www.youtube.com/watch?v=P1K-_mv9Hdg
- Ted Talk on Mental Health & Suicide in Construction: In this free 12-minute video, Vince Hafeli shares his story of tragedy and triumph. <https://www.youtube.com/watch?v=zrNdAT2vual>
- AGC-Missouri' Suicide Prevention Campaign: This is a website with a variety of free resources that address suicide prevention, mental health, and opioids awareness issues in the construction industry. <https://www.agcmo.org/suicideprevention>

Limitations

The limitations of this pilot study include, but are not limited to, the sampling methodology and the data collection tool. A convenience sample was utilized in order to move the study along as this topic is time sensitive. It is the intention of this author to share these findings in an attempt to build support for a more in-depth and larger study of its kind. In addition, while Slido may serve as a good tool for displaying polling results in real time during a PowerPoint presentation,

a more formal survey tool should be considered if/when a more in-depth study on this topic is undertaken.

Acknowledgement

This author wishes to thank University of Missouri-Extension's Labor and Workforce Education Professor, Doug Swanson, and Prevent+Ed's Executive Director, Nichole Dawsey, for providing input regarding the substance and purpose of this pilot study.

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Appendix A

Polling questions 1 – 5:

According to MHA (2021), what % of employees feel that their workplace stress impacts their mental health?

- 25
- 45
- 65
- 85*

According to MHA (2021), what % of supervisors do NOT provide support for an employee to manage stress?

- 19
- 39
- 59*
- 79

According to HHS (2016), _____, on average, people die from an opioid overdose each day.

- 16
- 60
- 116*
- 601

According to HHS (2016), the annual economic impact of the US's opioids crisis equates to about _____.

- US\$50b
- US\$80b
- US\$200b
- US\$500b*

According to the CDC (2016), which trade had the highest rate of suicides per 100,000 (males)?

- Iron Workers*
- Carpenters
- Electricians
- Plumbers

(* indicates the correct responses)

NOTE: Question #5 was altered for group(s) not specific to the construction industry, as follows:
5) According to the CDC (2016), which occupation had the highest rate of suicides per 100,000 (females)?

- a. Artists*
- b. Retail
- c. Iron Workers
- d. Laborers
- e. Nurses

Appendix B

Raw Data

YB	Pre	Post	Diff	% Incr
1	92	82	-10	
2	62	92	30	
3	58	80	22	
4	9	73	64	
5	27	82	55	
<i>TOTAL</i>	<i>248</i>	<i>409</i>	<i>161</i>	<i>65</i>
BUD				
1	53	87	34	
2	47	79	32	
3	79	100	21	
4	23	100	77	
5	38	100	62	
<i>TOTAL</i>	<i>240</i>	<i>466</i>	<i>226</i>	<i>94</i>
Champs				
1	36	60	24	
2	9	82	73	
3	27	91	64	
4	0	100	100	
5	45	100	55	
<i>TOTAL</i>	<i>117</i>	<i>433</i>	<i>316</i>	<i>270</i>
ARP				
1	22	63	41	
2	22	43	21	
3	44	86	42	
4	22	100	78	
5	63	100	37	
<i>TOTAL</i>	<i>173</i>	<i>392</i>	<i>219</i>	<i>127</i>
IMEC				
1	41	55	14	
2	13	64	51	
3	50	93	43	
4	11	93	82	
5	0	96	96	
<i>TOTAL</i>	<i>115</i>	<i>401</i>	<i>286</i>	<i>249</i>

Appendix C

T-test calculation:

$$t = \frac{57.7 - 57.2}{\sqrt{\frac{(44-1)335.68 + (25-1)1056.7}{44 + 25 - 2} (1/44 + 1/25)}}$$

$$t = \frac{.50}{\sqrt{\frac{14434.24 + 25360.8}{67} (.023 + .04)}}$$

$$t = \frac{.50}{\sqrt{593.96 (.063)}}$$

$$t = \frac{.50}{6.12}$$

$$t = 0.082$$

$$t_{\text{Crit}}(.10, 60 \text{ Two Tails}) = 1.671$$

$$0.082 < 1.671$$

Therefore, no significant difference

Std Dev	-18.32	32.51
Variance	335.68	1056.7
n	44	25
N		

**CAREER & TECHNICAL EDUCATION PROGRAMS IN SECONDARY
EDUCATION, AND AFTER, IMPACT ON WORKERS SUCCESS IN THE
CONSTRUCTION INDUSTRY**

Douglas Swanson

&

Mathew Pezold

ABSTRACT

This is the third, and final, article to come from a pilot study that asks self-identified construction workers in the greater St. Louis, Missouri, area to evaluate the impact of their secondary education on their current careers. In this study, the impacts of access to career preparation programs in industrial arts, now known as career and technical education, are explored.

Keywords: *Construction workers, high school education, workers' views on education, post-secondary education success.*

INTRODUCTION

This is the third in a series of articles stemming from the question, “How well did workers feel their high school education prepared them for their current career?” That question stemmed from discussions regarding the state of the United States workforce as we approach the second quarter of the 21st century. The United States is currently experiencing a worker shortage crisis. This shortage of employees has been building for years, and, while COVID-19 did not cause the crisis, it did in some cases accelerate it.

Often, the best metrics are drawn from sources closest to where impact occurs. After all, if you want to know how well the eggs were prepared, do not ask the chicken. You do not ask the cook. You ask the person who ordered and ate the eggs. When it comes to the education and training of workers, it is the workers' viewpoints and evaluations that should be considered the most valuable. Therefore, the focus of this article continues with the premise that the best way to measure the success of an education program is to ask the students who completed the program how well their education helped them to become successful in that career.

There have been two articles previously published in this journal, “Construction Workers’ Views on High School Education as a Barrier to Success in Their Field” (Swanson, 2021), which drew from an online national survey of workers in the construction industry, and “High School Education as a Barrier to Success in the Construction Industry? From workers’ perspective” (Swanson, 2022). Both of these studies involved online surveys and interviews of workers in Saint Louis, Missouri, who are in the construction industry. After completing these studies, it became apparent that if the workers who responded to the surveys and interview requests were also asked about their apprenticeship training, there would be an opportunity to glean additional valuable information. This article summarizes and draws conclusions from the data produced from the part of the research dealing with apprenticeship training.

Review of Literature

As noted in the introduction, this article draws from the aforementioned published articles. These two earlier articles focused on workers’ views relative to how their high school education helped prepare them for success in their chosen career field. In some cases, these workers were also asked to compare how prepared they were versus how prepared they view current new entrants into their field.

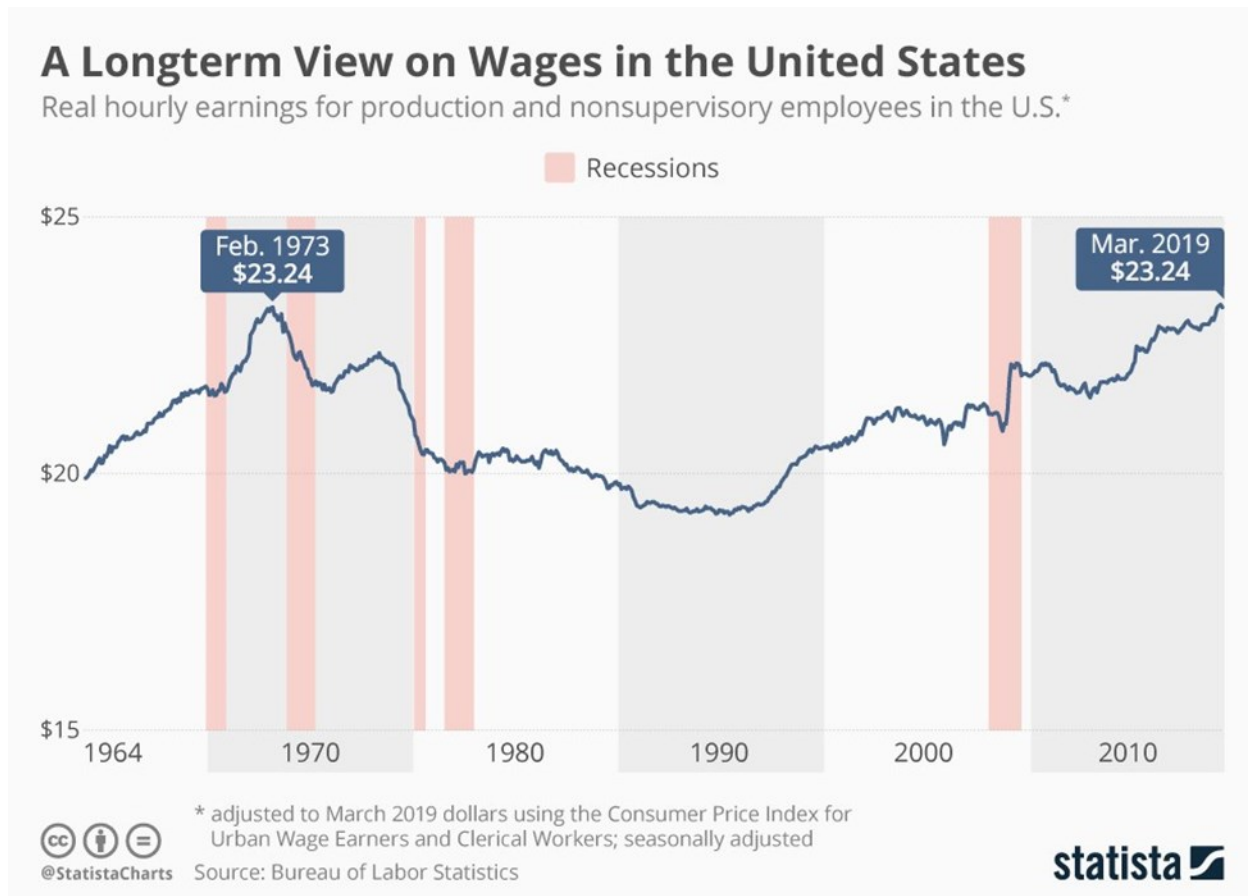
Historically, as far back as the 1500s in England, houses of correction were established to ‘train the children of the poor to be grouped up in labor and work’ (Isenberg, 2016, p. 21). Hence, the original purpose for early training of children was not to educate them but to prepare them for the workforce. With expansion and colonization, the apprenticeship structure of old Europe expanded to what we now recognize in other countries, the United States included. By the late 19th century and early 20th century, apprenticeships shifted from being institutions dominated by employers to institutions that are more generally dominated by unions (Jacoby, 2009). From the founding of the colonies, while apprenticeships brought new workers into skilled trades, those skills were taught through an assortment of unregulated and unstructured methods.

Driven by demands of World War I production needs, a coalition of labor and business helped the passage of the Smith-Hughes Act. This U.S. legislation, adopted in 1917, provided federal aid to states for promoting precollegiate education in industrial trades. In 1937, the National Apprenticeship Act, also known as the Fitzgerald Act, established the Registered Apprentice program as it is today, including regulations protecting the health, safety and general welfare of apprentices. Building on the foundations of the Smith-Hughes and Fitzgerald Acts, the Vocational Education Act, in 1963, and the Carl D. Perkins Vocational Education Act, in 1984, provided federal funding to employers and unions, both separately and together, in developing programs (Freund, 2021). On-the-job skills building, learning by doing, may have changed over time, but it is a part of the bedrock of work and developing workers. Yet, with few exceptions, the success or failure of high school educational programs is determined by the educators or employers, not the student who later join the workforce.

An overlooked outcome of World War II is the impact it had on the global workforce. In the United States, jobs in heavy industry and manufacturing were suddenly made available to women (as well as workers of color) during the war years. World War II followed on the heels of the Great Depression which had been preceded by World War I. After the end of World War II, there was effort to rebuild much of Europe that had been destroyed in the war, and an entire generation of U.S. citizens were eager to spend the money they had made during the war and in the jobs that followed it.

The war years had seen a decline in white-collar jobs as the demand shifted toward blue-collar jobs needed for production. Post-war demand for consumer goods kept the demand, and wages, for manufacturing jobs at a high level (Bellou & Cardia, 2016). At the same time, the G.I. bill provided post-secondary opportunities for veterans and the participation rates in these programs was robust (Bound & Turner 2002). An overlooked byproduct of these times is the lingering bias that everyone needs to go to college to be successful. Today, several generations after World War II veterans returned to the workforce, the default thinking is “go to college, make something of yourself.” An article in Forbes (2019) stated, “with so much pressure to go to college and follow the traditional career path, it can feel like there’s no other road to success” (Gold, 2019, p. 1). Although the period following World War II resulted in a generation of highly educated blue-collar workers, subsequent generations have struggled to obtain the same wages and benefits (See Figure 1).

Figure 1.



During the decades following World War II, wages for both incumbent workers and new workers entering the workforce stagnated or declined in the United States (World Economic Forum, 2019). At the same time employees in the United States are struggling with stagnating wages, college tuition and related student loan debt continues to increase, resulting in greater difficulties in following a clear pathway from high school to college to career success (Hanson, 2022).

As noted in “Construction Workers’ Views on High School Education as a Barrier to Success in Their Field” (Swanson, 2021), initial searches for research that focused directly on how workers evaluated, or provided feedback, on how their secondary education helped to prepare them for success in a post-secondary education workforce produced almost no results. What the searches did produce fell broadly into one of three categories: a) What education professionals believe workers and the workforce need; b) What businesses think of workers and workers’ needs; and c) Workers as subjects to be studied (but not through direct communication with the workers) (Swanson, 2021).

Although a literature review related to how workers evaluate their secondary education found existing research to be scarce, there is a considerable amount of research on factors that have been frustrating students and workers in recent years. These factors, including stagnating wages

and increasing student loan debt, are causing students and employees to publicly voice their concerns around decreased access to career and financial success in the United States (Buchanan, Bui, & Petel, 2020).

Given these changes in the dynamics of the U.S. workforce, it is critical that the right tools are used with the right person(s) when preparing future workers for the workforce. In this article, apprenticeships, in the U.S. construction industries, are evaluated by the workers who completed these programs.

RESEARCH METHODOLOGY

With the research subjects for the initial study being U.S. construction workers, specifically workers who have been out of high school for approximately 20 years, giving them experience to draw upon, it would have been a wasted opportunity to not ask them about their apprenticeship programs. As in the article “Construction Workers’ Views on High School Education as a Barrier to Success in Their Field” (Swanson, 2021), the methodology for this study was a survey, focusing primarily on workers out of high school long enough to have been able to test the skills they brought into the workforce. These workers would have witnessed and/or experienced the skills later entrants into the workforce possess as well, and likely would have generated insights on what skills future workers will need to be successful. The survey was online and available nationally. The survey questions asked can be found in Appendix A.

Sampling

To avoid the real, or perceived, bias that can be created by preselecting who receives the survey, the survey was distributed using a method known as ‘snowballing’ (Creswell & Creswell, 2018). Snowballing distribution is a process of forwarding a survey to individuals in diverse fields and locations who are asked to distribute the survey link to workers meeting the criteria. By distributing the survey in this manner, the researcher is unaware who is receiving the survey, eliminating any possibility of influencing the outcomes. The downside of this distribution method is that it prevents the researcher from being able to make any special efforts that would increase responses from specific groups, such as minorities or women.

Data Collection

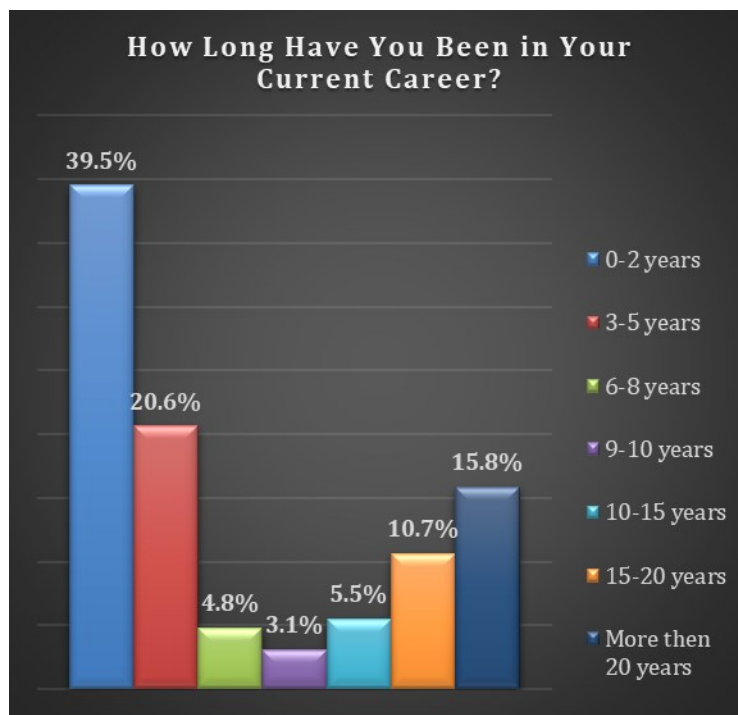
The study also focused on the skills needed by future workers to be successful when entering this industry. It is in this section that the opinion of the workers who have been in the workforce for two decades is critical since they may well remain in the workforce for another decade or two. This demographic of workers possesses the experience to know what needs to be done, and they will also remain employed in the future to ensure that the new hires possess the knowledge and skills required to be successful.

RESULTS AND DISCUSSION

Levels of Experience in the Skilled Trades

The survey sampled 291 workers in the skilled trades, and an estimated 50 percent of the respondents are currently enrolled in a registered apprenticeship program. The distribution of the sample suggests that there could be a hollowing out of the skilled trades workforce and that many exit the unionized workforce in their first 10 years (See Figure 2). It is interesting to note that those who make it beyond the first 10 years are likely to continue as members of organized labor. In looking at the future of the workforce, 26.5 percent of the sample has been employed in the trades for 15 or more years. In the next 15 years, many of those workers will retire, and the younger cohort of workers immediately preceding them is smaller than those who are nearing retirement. This suggests that challenges in attracting skilled workers will likely worsen in the upcoming decades unless more employees are recruited, trained, and successfully retained. A shortage of workers could limit the pace of construction and could drive up wages in the construction industry.

Figure 2.



Attitudes About Preparation to Enter the Skilled Trades

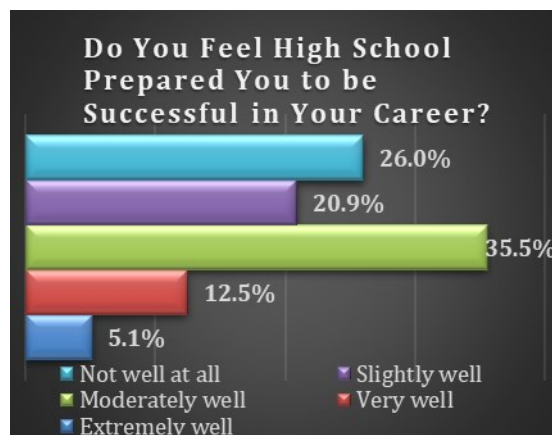
The results of this survey suggest that there are not enough workers entering the skilled trades, and that there could be a shortage of workers in the future. This information also suggests that there are challenges in the recruitment and development of skilled workers. The first point of

exposure for many future construction workers is in high school, particularly through industrial and technical education programs (See Figure 3). To capture attitudes about high school, survey participants were asked if industrial arts programs prepared them to enter the workforce and how well high school, in general, prepared them to enter the workforce. In the pie chart below, 128 participants shared their perspectives about industrial arts programs, and 67 percent indicated that their industrial arts programs helped them prepare to successfully enter the workforce. In Figure 4, 273 respondents shared their perspectives about how well high school prepared them for their careers. While the sample in the bar chart is much larger than the pie chart, it is interesting to note that only 17.6 percent feel that high school did an above-average job at preparing them for their careers. Fewer than half, 46.9 percent, feel that high school either did a poor job, or a slightly good job at preparing them for their career, while 35.5 percent feel that high school did a moderately good job at preparing them for their careers. These percentages suggest that many who enter the skilled trades do not feel that high school did an adequate job in preparing them for the skilled trades. One way to improve recruitment in the trades may be to develop, improve, or expand industrial arts programs, now known as Career & Technical Education programs, in high schools.

Figure 3.



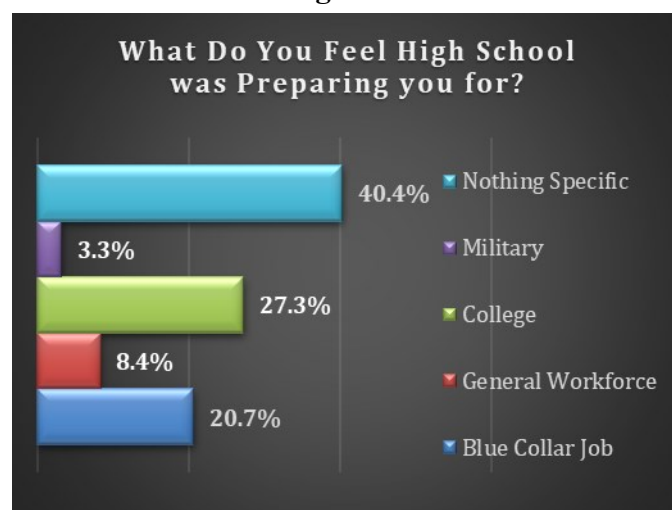
Figure 4.



It appears that many respondents believed that CTE programs within high schools did a good job of preparing them to enter the skilled trades. However, overall, respondents do not feel that high school was very valuable in preparing them to be successful in the skilled trades. Looking deeper, the next survey question asks participants what pathway they feel high school was preparing them to enter. This question, Figure 5, generated 275 responses and 40.4 percent indicated that high school was not preparing them for any specific career pathway, while 27.3 percent of respondents indicated that it was focused on preparing them for college, and 20.7 percent indicated that it was preparing them for a blue-collar career. These results can be interpreted in several ways.

One interpretation is that many of those who enter the skilled trades might not have had the best experience in high school, so they feel that high school was not preparing them for the workforce. A second interpretation is that only 27.3 percent felt that high school was preparing them for college, which means that the other 72.7 percent felt that they were being prepared to enter the workforce but they might not have identified a specific career field. This finding suggests that there may be an opportunity to improve career exploration and provide exposure to a wide variety of careers, including the skilled trades. One example of a realignment of career pathways is found in the North Kansas City Public Schools. In this model, the schools created four broad college and career pathways, aligned with leading industry sectors.

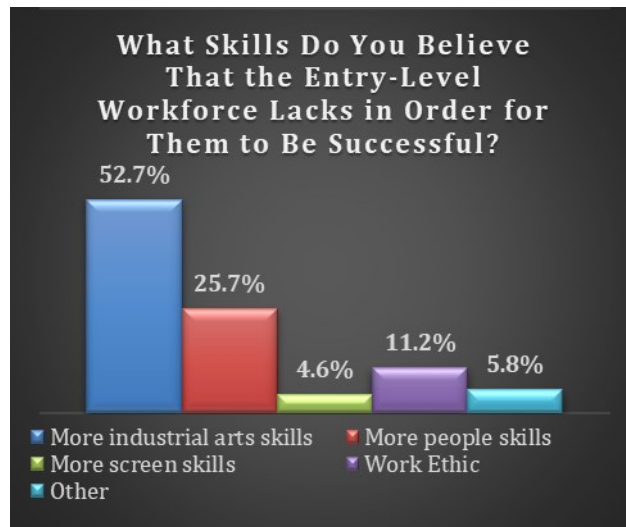
Figure 5.



Attitudes About the Future Workforce

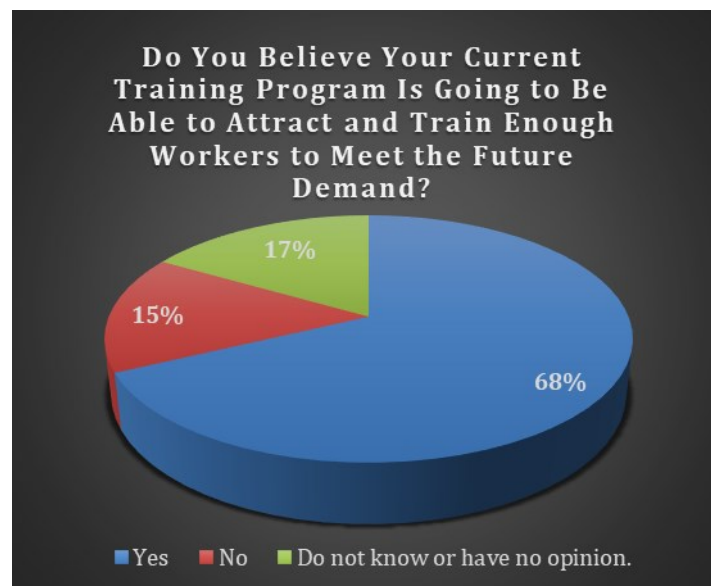
The survey also investigated the perceptions of the next generation of workers. In Figure 6, 180 respondents shared their perceptions about what skills the emerging workforce lacked. Not surprisingly, 52.7 percent believed that the incoming workforce was lacking in industrial arts skills. This is not surprising because even among those in the skilled trades, many had not participated in a technical education program while in high school. This finding suggests that many individuals are entering the skilled trades with limited technical experience in construction.

Another 25.7 percent report that the incoming workforce needs improved people skills, which are necessary for training purposes, as well as for directing job site tasks and following instructions. However, within the comments sections, a previously unidentified skill emerged, which can be characterized as work ethic. Many strong opinions were shared, and the general sentiment was that the incoming workforce is perceived as lazy, undependable, and unwilling to learn. This skill of work ethic, or willingness to work hard, was identified by 11.2 percent of the respondents.

Figure 6.

In Figure 7, the 252 respondents were asked if their training program would be able to continue to supply enough skilled workers in their respective trades. Somewhat contradictorily, 68 percent believe that their training program will be able to attract and retain enough workers to meet the demand in the construction trades.

One way to interpret the two previous questions is that workers feel that the incoming generation of workers is unprepared and lazy, but that their training program will successfully develop and weed out the workers who are not well suited to make a career out of the skilled trades. However, just because a training program can successfully develop workers does not mean that there will always be an adequate supply of recruits entering those training programs. If there aren't enough new workers, contractors may need to bid on fewer or smaller jobs and the existing workforce may be forced to work longer hours.

Figure 7.

CONCLUSION AND RECOMMENDATIONS

The findings from the study indicate there may not be sufficient new employees to replace the current workforce or meet the demand for more skilled workers. In response, many apprenticeship programs have changed how they promote their programs over the past decade. However, clearly more work needs to be done. This process will not be easy because there is not “one” worker, nor one type of worker, being recruited for the skilled trades. Multiple outreach tools need to be explored and implemented to reach a shrinking workforce. There need to be methods to attract young workers who are new to the workforce as well as methods to assist older workers looking to change their career paths.

These data demonstrate that the shortage of new workers entering technical careers is worsened by high schools that are no longer offering industrial arts programs or providing sufficient emphasis on skilled trades as potential career fields. Expanding industrial arts or career and technical education programs would greatly enhance students’ exposure to these kinds of jobs. Creating pathways for experienced craft workers to become career and technical educators and program advisors, without having to take salary cuts, needs to be explored.

Outcomes from this study also shed light on how high schools appear to be preparing students for post-secondary education and not necessarily the workforce. Students who are not interested in post-secondary education do not believe they are being prepared for the future, and students who do plan to pursue post-secondary education may not understand pathways beyond college. High schools need to create more structured programs that will help students identify careers and career paths.

Finally, high schools and apprenticeships programs need to identify ways to help students develop positive work habits. Much of the focus of today’s education is on technology, which is needed, but we are seeing that basic people skills and a solid work ethic are also essential to be successful in the workplace.

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APPENDIX A

Survey questions:

Q1 – You are invited to participate in a research study being conducted by Douglas J. Swanson. The purpose of this research is to answer the question, ‘how well do construction workers believe a high school education prepared student for success in the workforce’ and will take about 10 minutes.

Participation in the study is voluntary. You may withdraw from of the study at any time without penalty. Participants are encouraged to answer all of the questions but are under no obligation and may not answer individual questions.

Taking the survey constitutes your consent and acknowledges your opportunity to ask questions.

Q2 - What is your current age?

Q3 - What is your gender?

Q4 - What is your race?

Q5 - What ethnicity do you identify as?

Q6 - What year did you last attend high school?

Q7 - Did you complete high school?

Q8 - What is your current career?

Q9 - How long have you been in your current career?

Q10 - In what state did you attend high school? (If you went to high school in more than 1 state, choose the state where you spent the majority of those years).

Q11 - How well do you feel your high school education prepared you to be successful in your career?

Q12 - When you were in high school, do you feel you were being prepared to go:

For the next several questions, we will use the terms like ‘**Industrial Arts**’, ‘**Technical Skills**’ and ‘**People Skills**’. For these questions, use the following definitions:

An Industrial Arts education could include:

Fabrication of objects in wood, metal, plastics or composites;

Use of a variety of hand, power or machine tools;

Electrical or electronics systems installation or repairs;

Small engine repair; and

Automobile maintenance and repair.

Example of Industrial Arts careers would include:

Construction industry jobs;
Mechanics; and
Tool and die makers.

Industrial Arts jobs are sometimes referred to as jobs where you are ‘working with your hands.’

Technical Skills education could include:

Skills utilized in operating computers and tablets to run machines,

Installing programs and up-keeping systems that are necessary to operate equipment, machinery and/or to input data for the equipment and machinery to operate.

Skills needed in operating programs and applications that are accessible through touchscreens. These jobs do not rely on basic office skills (word-processing, spreadsheets and PowerPoint) computer skills but some data entry may be used.

Examples of Technical Skill job include:

3D printer operator;
Machinist; and
Machine operator (i.e., lathe, punch press, etc.)

Technical Skills jobs are sometimes referred to as jobs that require workers to operate or use ‘screens’ to access equipment and/or programs or spend a lot of ‘screen time’ during their work shift.

People Skills: is a broad umbrella term for skills intended to improve a person’s interaction, intercession and personal effectiveness skills when working with other people. People skills jobs often require one to develop teamwork, problem-solving, and emotional intelligence skills.

Examples of People Skills jobs would include:

Customer service
Sales and
Jobs in the service sector

People Skills job educational programming may have focused on skills like:

Speech / Oral Communications
Psychology and
Human relations

Q13 - Did the high school that you attended for the longest part of your high school tenure offer an industrial arts program?

Q14 - Did you enroll in any industrial arts courses?

Q15 – Did the industrial arts courses that you took in high school help you to prepare to be successful when you entered the workforce?

Q16 - Did the high school that you attended for the longest part of your high school tenure have courses that helped you with computer/screen skills that you utilize in your work today?

Q17 - If yes, did you enroll in any technical skills courses?

Q18 - Did the technical skills courses that you took in high school help you to prepare to be successful when you entered the workforce?

Q19 - Did the high school that you attended for the longest part of your high school tenure have a program that provided you the skills that you need to work well in industries that demanded good ‘people skills?’

Q20 - Did you enroll in any people skills courses?

Q21 - Do you think the people skills courses helped to prepare you to be successful when you entered the workforce?

Q22 - Today, can someone with only a high school education be successful in an entry-level position in your profession?

Q23 - Does your current career have a training or apprenticeship program?

Q24 - Is there a fee required to enter the training or apprenticeship program?

Q25 - Once you entered the training or apprenticeship program was there a cost to continue in the program?

Q26 - In total, how much did the training cost you?

Q27 - Is the training/apprenticeship program industry recognized and transferable to other states (or countries)?

Q28 - If you answered yes, your craft/profession has a training/apprenticeship program, is it able to attract all of the new workers to its training/apprenticeship program that it needs to meet current demand?

Q29 - As your industry is changing, do you believe your current craft/profession training/apprenticeship program is going to be able to attract enough new members to meet the future demands for workers?

Q30 - Typically, how long does it take someone to complete the training/apprenticeship program?

Q31 - Regarding the knowledge it takes to be successful in your trade, do you think your job is more or less complicated or complex than when you started in your current career?

Q32 - Do you feel that the workers entering the workforce today have the same skill(s) needed to be successful as you and your generation did when you entered the workforce? Please complete the following sentence that best describes your views.

Q33 - What skills do you believe the current new members of the workforce are lacking in order for them to be successful?

Q34 - Think about how much the skills needed to be successful in your job have changed or have not changed over the past 5 - 10 years. Taking into consideration the skills you observe in current entry-level workers, do you think workers entering the workforce 5 - 10 years from now will possess the skills needed to be successful in your trade?

Q35 - What skills do you believe the current entry-level workforce lacks in order for them to be successful in today's workforce?

VOCATIONAL EDUCATION TEACHERS' PEDAGOGICAL DIGITAL COMPETENCE

Eila Burns & Susanna Kanninen

ABSTRACT

Digitalization poses challenges for VET teachers in delivering high-quality, work-oriented education to diverse student populations. It also brings forth new dimensions in VET teachers' pedagogical digital competences, which have not received much research attention despite their crucial role in preparing employees for the future workforce. The aim of this study is to contribute to the research on VET teachers' digital competences by presenting the findings of an international study and having a particular focus on pedagogical digital competences (PDC).

This study utilized data gathered through a web-based survey of 218 VET teachers from four European countries: Finland, Italy, the Netherlands, and Spain (Catalonia). Convenience sampling was used to gather data and ensure representation from various professional fields. VET teachers' responses were analyzed quantitatively with IBM SPSS Statistics assessing means and sum variables across seven sub-areas based on Likert-scale statements. The results indicate VET teachers self-assessing their PDC in the selected sub-areas above the average level. Out of the seven sub-areas, the building interaction and teamwork for online teaching received the highest score. The sub-areas involving feedback and assessment and web content production were assessed as the lowest. The remaining sub-areas: planning online teaching, guidance in online environments and developing one's digital competences received equal scores.

The findings indicate VET teachers, aged 35 or younger, assess their competences higher than their older colleagues, and those with less than 10 years of teaching experience assess their competences higher than more experienced teachers. Also, teachers with two or more years of online teaching experience reported higher competence levels compared to those with less experience. The findings indicate that younger VET teachers (35 years or younger) and those with less than 10 years of teaching experience displayed slightly higher pedagogical digital competences than the other groups, possibly indicating a generational shift among teachers. However, longer experiences in VET does not seem to diminish teachers' competences; instead, they remain at similar levels and can be effectively transferred to online teaching environments even after 20 or more years of teaching. Based on the findings, the most effective approach to enhancing VET teachers' pedagogical digital competence development is to provide them with opportunities to gain experience in online teaching. Therefore, we encourage VET teachers, irrespective of their demographic backgrounds, to build confidence in digital learning environments, for example by pair-teaching.

Keywords: *VET teacher, pedagogical digital competence, vocational education and training, digital skills, digital learning.*

INTRODUCTION

Digitalization and its impact on educational institutions and teachers have been the subject of extensive research and discussions in recent years. Within this context, the vocational education and training (VET) sector plays a critical role in digital transformation, as it is closely involved in preparing skilled employees for the future workforce. The job market has experienced significant changes due to digitalization, including the emergence of the fourth industrial revolution (Billet, 2021) and the evolving relationship between humans and machines (Pfeiffer, 2018). Consequently, teachers and other VET education providers face the challenge of continuously adapting to the evolving skill requirements brought about by digitalization. This necessitates the development and enhancement of digital competences among both VET organisations and teachers.

Over recent decades, considerable attention has been given to investigating teachers' information and communication technology (ICT) and digital skills (Almerich et al., 2016; Roll & Ifenthaler, 2021), and several conceptual frameworks have been developed to clarify what digital competences should include (Redecker & Punie, 2017; UNESCO, 2018). However, there has been a relative lack of research on the pedagogical digital skills and competences of VET teachers. Although, scholars have previously characterized VET teachers' digital competences as being complex and fragmented (Tapani & Salonen, 2019), and comprising multiple components (Vilppula et al., 2022). Therefore, this study aims to contribute to the research on VET teachers' competences by presenting the results of an international study with a specific focus on pedagogical digital competences (From, 2017). The study is part of a broader situational analysis conducted as part of the Smooth Online Working for VET Providers (SHOW-VET) international project in 2022. The situational analysis aimed to map VET teachers' existing knowledge and experiences in digital pedagogy and identify gaps in their competences that will require upskilling. Within this analysis, VET teachers (n=218) self-assessed aspects of their digital and pedagogical competences relevant to their work. This article specifically reports the findings related to VET teachers' pedagogical digital competences (PDC).

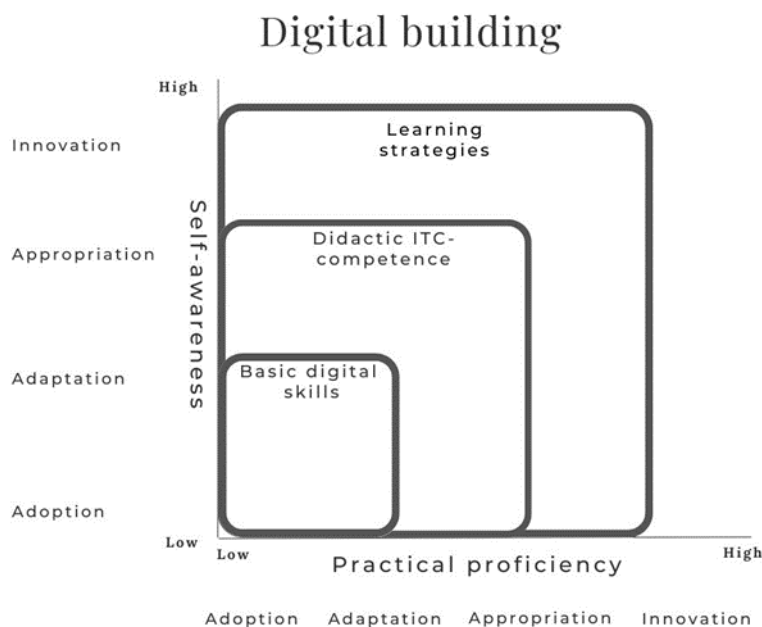
Theoretical frameworks on VET teachers' digital competences

Teachers' digital competence (TDC) is a crucial factor in effectively integrating technology in education, encompassing personal and contextual aspects (Cattaneo, et al., 2022). TDC can be broadly defined as the confident, critical, and creative use of information and communication technology (ICT) to achieve goals related to work, employability, learning, leisure, inclusion, and societal participation (Redecker & Punie, 2017). TDC is considered a transversal and multidimensional concept (Pérez-Escoda et al., 2019), comprising various dimensions or components (Ilomäki et al., 2016; Vilppola et al., 2022). Ilomäki et al. (2016) propose four components of teachers' digital competence: practical skills and their application, understanding digital technologies, engagement in the digital culture, and reflective thinking. Similarly, Vilppola et al. (2022), in their study of VET teacher trainees' work-based training, identified six main ICT competence components: creation and use of digital learning materials,

planning and utilization of digital learning environments, synchronous digitally enhanced teaching, general ICT competencies, digital interaction, and digital assessment.

In addition to TDC, the concept of teachers' pedagogical digital competence (PDC) has been discussed and introduced in the research literature (From, 2017; Purina-Bieza, 2021). PDC refers to the knowledge, skills, attitudes, and approaches related to digital technology, learning theory, subject matter, context, and the relationships between them (From, 2017). These definitions of PDC have been built upon Krumsvik's (2012, 2014) model of teachers' digital competence (Figure 1). Krumsvik's model portrays digital competence development as a journey that encompasses both practical knowledge (proficiency) and self-awareness (meta-perspective), progressing through four stages: adoption, adaptation, appropriation, and innovation. According to Krumsvik (2012), this developmental journey, which involves practical knowledge acquisition and self-reflection, is a gradual process that takes several years to reach the innovation level where teachers can fully exploit ICT to develop new pedagogical innovations (Krumsvik, 2012).

Figure 1: Teacher's pedagogical digital competence (based on Krumsvik, 2012).



In this article, the understanding of pedagogical digital competence is informed by the definitions provided by Krumsvik (2012) and From (2017). According to these scholars, the digital competence of teachers and teacher educators differs from that of professionals in other fields. They argue that teachers' digital competence encompasses not only practical skills but also cognitive abilities, metacognition, learning strategies, self-efficacy, and pedagogic-didactic

aspects. Consequently, we conceptualize pedagogical digital competence (PDC) as VET teachers' capacity to develop and enhance their pedagogical practices through the effective utilisation of digital technology in professional contexts. PDC comprises both practical and conceptual knowledge, as well as an understanding that competences can be developed over time. Aligning with From's (2017) perspective, we acknowledge that PDC is demonstrated through concrete actions within VET teachers' professional contexts and can be expected to develop and mature as VET teachers gain more experience. Thus, in order for VET teachers to attain PDC it is important to keep up to date with and understand concepts of relevant pedagogical approaches suitable for digital learning in their specific professional subjects. Additionally, acknowledging these theoretical, subject and context related aspects, PDC requires teachers to have a relationship with emerging digital technologies that enables them to use those tools efficiently in supporting students' learning. Subsequently, the objective of this study is to enhance awareness and knowledge of this multifaceted phenomenon by evaluating and analyzing VET teachers' pedagogical digital competences using an online survey. The research questions formulated for this study are as follows:

1. What is the status of VET teachers' pedagogical digital competences?
2. What possible relationships exist between VET teachers' demographic and professional profiles and their pedagogical digital competences?

RESEARCH DESIGN

This section provides an overview of the study's sample, data collection procedure, the self-assessment survey, and the statistical analyses conducted to address the research questions.

Sample and Procedure

Data collection took place between February and April 2022, utilising an online survey administered through the Webropol electronic system. The survey targeted VET teachers in four countries: Finland, the Netherlands, Italy, and Spain (specifically Catalonia). The objective of the online survey was to assess the current status of digital competences among VET teachers representing various professional fields. The selected professional fields included Digital, Beauty & Wellness, Business, Chemistry, Nature Guidance and Animal Care, Healthcare, Tourism, Mechanical Engineering, Production Technology, and special programs for adults. The VET colleges participating in the survey in each country identified two VET fields each in which the most support was needed to enhance teachers' digital competences.

Participants were invited from the four countries, and convenience or accidental sampling techniques (Saumure & Given, 2008) were employed to gather voluntary responses. The anonymity of participants was preserved during data collection. A total of 218 VET teachers completed and submitted the survey responses for analysis. Demographically, approximately two-thirds (64 percent) of the respondents were female, while one-third (34 percent) were male. Regarding age distribution, 43 percent of the participants were 45 years old or younger, while

55 percent were over the age of 46. Additionally, three percent of respondents chose not to disclose their age. The majority of participants (52 percent) were from Spain, with the remaining percentages represented by Finland (23 percent), Italy (15 percent), and the Netherlands (10 percent). Regarding teaching experience, more than a quarter of the respondents (28 percent) reported having less than 5 years of experience, while almost a quarter (24 percent) indicated 6 to 10 years of teaching experience. The remaining group of VET teachers (47 percent) reported having more than 10 years of teaching experience. In terms of online teaching experience, over half of the respondents (54 percent) reported having no or less than 2 years of experience, while 36 percent reported 2 to 5 years of experience, and another 36 percent reported more than five years of experience in online teaching. The participants represented the following VET fields: Business (39 percent), Chemistry (13 percent), Digital (13 percent), Production Technology (10 percent), Beauty and Wellness (6 percent), Other (18 percent), and 1 percent did not specify their vocational field. The demographic characteristics of participants are presented in Table 1.

Table 1: Demographics of the sample

<u>Gender</u> <i>n</i> %	<u>Male</u> 74 34%	<u>Female</u> 140 64%	<u>Other</u> 4 2%			
<u>Age range (years)</u> <i>n</i> %	<u>< 35</u> 36 17%	<u>36 -45</u> 57 26%	<u>46- 55</u> 84 39%	<u>> 55</u> 35 16%	<u>Not shared</u> 6 3%	
<u>Country</u> <i>n</i> %	<u>Spain</u> 114 52%	<u>Finland</u> 50 23%	<u>Italy</u> 32 15%	<u>Netherlands</u> 22 10%		
<u>Teaching experience (years)</u> <i>n</i> %	<u><5</u> 60 28%	<u>6-10</u> 53 24%	<u>11-15</u> 29 13%	<u>16-20</u> 25 11%	<u>≥20</u> 51 23%	
<u>Online teaching experience (years)</u> <i>n</i> %	<u>None</u> 15 7%	<u>< 2</u> 102 47%	<u>2-5</u> 78 36%	<u>>5</u> 20 9%	<u>Don't know</u> 3 1%	
<u>VET field</u> <i>n</i> %	<u>Business</u> 85 39%	<u>Chemistry</u> 28 13%	<u>Digital</u> 29 13%	<u>Production Technology</u> 22 10%	<u>Beauty & Wellness</u> 13 6%	<u>Other</u> 39 18%

Self-assessment survey

To examine the existing pedagogical digital competences of VET teachers, an anonymous online survey was developed based on the European Digital Competence Framework for Educators (DigCompEdu) (Redecker & Punie, 2017), which has been widely used for analysing and assessing teachers' digital competences. The DigCompEdu framework, developed by the European Commission's Joint Research Centre (JRC), offers a scientifically grounded approach, and introduces a set of digital competences specific to the teaching profession across all levels of education (Redecker & Punie, 2017). Additionally, the current study integrated some VET-specific items, e.g., collaboration with businesses, into the situational analysis survey.

The self-assessment survey consisted of 14 sub-areas. However, for the purposes of this study, which focuses on pedagogical digital competences, 7 sub-areas comprising 50 competence statements were selected for analysis. The remaining sub-areas covered topics such as knowledge of one's organization's technological environment, searching for material using organization-specific databases, country-specific copyright issues, data security within one's own organization, and the use of digital tools specific to the organization. Although these topics are essential for VET teachers, they are considered to be more aligned with general digital competences rather than specific elements of pedagogical digital competences and therefore were not included in the analysis.

Participants were asked to self-assess their pedagogical digital skills and their prospects for engaging in digital activities within their teaching processes. VET teachers rated their current practices by indicating their level of agreement with the provided statements using a 4-point Likert scale, where 1 indicated "completely disagree," 4 indicated "completely agree," and there was also an option to choose "I don't know." The sub-areas and the number of statements in each are presented in Table 2.

Data analysis

The data analysis involved the use of descriptive statistics to examine the status of teachers' pedagogical digital competences. All quantitative questions were analyzed using IBM SPSS Statistics version 28.0.1.1. This included calculating means and sum variables for the seven different subareas with the Likert-scale statements. The various domains of questions were analyzed in relation to background variables such as age group, teacher experience in years, and experience in online/hybrid teaching in years.

To assess the internal consistency of the different domains, Cronbach's alpha values with 95% confidence intervals were computed within each domain. Cronbach's alpha provides an estimate of the interclass correlations within each domain. The number of items in each domain, the mean value, the confidence intervals, and the Cronbach's alpha values are presented in Table 2. The Cronbach's alpha values for each domain were good or excellent ($\alpha < 0.8$). The sum variables representing different aspects of digital teaching were then analyzed using the Kruskal

-Wallis test, as the sample distribution was not normal. This non-parametric test is appropriate for comparing differences between groups using ranks (Pallant, 2016).

Table 2: Sub-areas of pedagogical digital skills.

Domains	N of items	Mean value	95% CI		<i>p</i>	Cronbach α
			Lower	Upper		
Web-content production	5	2.96	.814	.880	.000	.850
Planning online teaching	9	2.97	.870	.917	.000	.895
Building interaction and teamwork	9	3.22	.867	.914	.000	.892
Guidance in online learning environments	6	3.08	.894	.932	.000	.915
Learning tasks	8	3.00	.905	.938	.000	.923
Feedback and assessment	7	2.85	.889	.928	.000	.910
Developing digital competences	6	3.10	.790	.861	.000	.834

Note. Participants rated the questionnaire on a 4-point Likert scale ranging from 4 - Completely agree to 1 - Completely disagree

Findings

The results focused on exploring the possible relationships between VET teachers' demographic and professional profiles and their pedagogical digital competences. The results, presented in Table 3, are divided into three sections: total means, means by age group, means by teaching experience in years, and means by experience in online teaching in years.

The findings indicate that VET teachers aged 35 years or younger assessed their competences in all seven sub-areas higher than their colleagues. The mean scores for this age group were significantly higher, particularly in offering guidance in online learning situations ($M = 3.5$), creating learning tasks ($M = 3.4$), giving feedback and conducting assessment ($M = 3.2$), and developing and sharing their own digital competences ($M = 3.4$). VET teachers in the age group

of 36 to 45 years also rated their competences slightly higher than their older colleagues in the aspects of building interaction and teamwork ($M = 3.3$), guidance in online learning ($M = 3.1$), learning tasks ($M = 3.1$), and sharing and developing digital competences ($M = 3.1$). Among VET teachers aged 46 to 55 ($n=84$) and over 55 years ($n=35$), the evaluation of digital teaching competences was fairly similar (refer to Table 3). The analysis highlights that all age groups rated the aspects related to feedback and assessment ($M = 2.8$) and web content production ($M = 2.9$) as the lowest.

A non-parametric test, Kruskal-Wallis, was conducted to examine the differences between age groups, teaching experience in years, experience in online teaching in years, and the different domains. The Kruskal-Wallis test is appropriate for comparing differences between more than two groups using ranks when the data is not normally distributed. The test revealed statistically significant differences in all seven domains between different age groups (see Appendix 1 for specific test results of each domain). Furthermore, statistically significant differences were found in web content production ($\chi^2(4) = 13.987$, $p = 0.007$), planning online teaching ($\chi^2(4) = 17.592$, $p = 0.001$), guidance in hybrid and online learning environments ($\chi^2(4) = 16.537$, $p = 0.002$), learning tasks ($\chi^2(4) = 18.499$, $p < 0.001$), and feedback and assessment ($\chi^2(4) = 11.072$, $p = 0.026$) and experience in online and hybrid teaching. However, no statistically significant differences were found between VET teachers' teaching experience in years and the domains. Regarding teaching experience, VET teachers with 5 to 10 years of experience assessed their competences slightly higher than more experienced teachers in almost all aspects (refer to Table 3). Additionally, the results show that VET teachers with the least work experience (less than 5 years) rated their skills slightly higher than those with the longest experience (more than 20 years). On the other hand, VET teachers with a long teaching experience (11 years or more, $n=105$) assessed themselves as having rather similar levels of competences in all seven aspects of teaching in digital environments (Table 3). When examining the means of differences between experience in online teaching and the sub-areas, significant variations were found. VET teachers with two ($n=78$) or over five years ($n=20$) of experience in online teaching rated their skills higher compared to those with less experience. Table 3 displays the means of all sub-areas being significantly higher among this group of teachers compared to those with less ($n=102$) or no experience ($n=15$).

Table 3: Means of the sub-areas by age and teacher and online teaching experience in years.

<i>M (1-4)</i>		Web content Production	Planning online teaching	Building interaction and teamwork	Guidance in online learning environments	Learning tasks	Feedback and assessment	Developing digital competences
TOTAL (N=218)		2.9	3.0	3.2	3.0	3.0	2.8	3.0
Age group	35 or less (<i>n</i> =36)	3.2	3.3	3.5	3.5	3.4	3.2	3.4
	36-45 (<i>n</i> =57)	3.0	3.0	3.3	3.1	3.1	2.9	3.1
	46-55 (<i>n</i> =84)	2.8	2.9	3.1	2.9	2.8	2.7	3.0
	Over 55 years (<i>n</i> =35)	2.6	2.7	2.9	2.7	2.8	2.5	2.9
	Don't want to share (<i>n</i> =6)	3.0	3.0	3.4	2.9	3.1	2.8	2.7
Teacher experience in years	Less than 5 years (<i>n</i> =60)	3.0	3.0	3.3	3.2	3.1	2.9	3.2
	5-10 y (<i>n</i> =53)	3.0	3.1	3.3	3.2	3.1	2.9	3.2
	11-15 y (<i>n</i> =29)	2.9	2.9	3.2	2.9	3.1	3.0	3.0
	16-20 y (<i>n</i> =25)	2.9	2.7	2.9	2.7	2.7	2.7	2.8
	More than 20 years (<i>n</i> =51)	2.8	2.9	3.1	3.0	2.9	2.6	3.0
Online teaching experience in years	No experience (<i>n</i> =15)	2.3	2.6	2.9	2.6	2.7	2.4	2.7
	Less than 2 years (<i>n</i> =102)	2.9	2.8	3.1	3.0	2.8	2.7	3.0
	2-5 years (<i>n</i> =78)	3.1	3.1	3.3	3.2	3.2	3	3.2
	Over 5 years (<i>n</i> =20)	3.1	3.2	3.4	3.3	3.2	3.1	3.3
	Don't know (<i>n</i> =3)	2.7	2.8	2.8	2.3	2.6	1.9	2.7

DISCUSSION AND CONCLUSIONS

The purpose of our study was to investigate the pedagogical digital competences (PDC) of a selected group of VET teachers in four different European countries. The study utilised an online survey to measure and map the current situation of VET teachers' PDC in seven sub-areas: web-content production, planning online teaching, building interaction and teamwork, guidance in online learning environments, learning tasks, feedback and assessment, and developing one's digital competences.

Regarding the first aim of the study, which was to assess the current situation of VET teachers' pedagogical digital competences, it was observed that the competences in the seven aspects were quite similar. The total scores in pedagogical digital competences averaged at a mean value of 3.0 on a 4-point Likert scale, which closely aligns with scores obtained in similar studies. For instance, Cattaneo et al. (2022) reported a mean value of 3.09 in their study of Swiss VET teachers. These results support the findings of other studies, indicating that VET teachers generally possess above-average pedagogical digital competences. It can be speculated that the teachers might have been unaware of the criteria descriptions of skills and competences required at level four, as such criteria do not exist. Therefore, assessing themselves with an average score would be understandable, as teachers are professionals in assessment and are accustomed to evaluating based on set criteria.

Analyzing the specific scores obtained for each of the seven sub-areas, it was discovered that the building interaction and teamwork aspect was, on average, the most developed among all teachers, while the feedback and assessment sub-area was the weakest. Possible explanations for these results could be based on global issues that have emerged in recent years. During the COVID-19 pandemic, online teaching was the only option for VET education and it appears that some lessons have been learned from it. Since then, there has been increased emphasis on students' engagement in digital learning environments as many students were losing their motivation in online learning situations and there was a reduction of their overall well-being. Consequently, VET teachers were encouraged to identify and select digital tools and pedagogical methods to enhance students' interaction and engagement in vocational learning. Relative to the low scores in assessing learning, it appears that reviewing feedback and assessment methods in digital learning contexts received less attention than promoting student engagement. Assessing learning in digital environments might have focused mainly on summative assessment methods based on examinations or tests that may have deterred VET teachers from exploring and using different digitalized feedback and assessment formats.

The second aim of the study was to investigate possible relations between VET teachers' demographic, professional profiles and their pedagogical digital competences. The seven sub-areas were examined by calculating means across the following background dimensions: age group, teaching experience, and online teaching experience in years. The results suggest that younger teachers (35 years and below, $n=36$) rated their competences in all seven sub-areas higher than their older colleagues. This might indicate that the younger generation of teachers

(Fernández-Cruz & Fernández-Díaz, 2016) are more accustomed to evaluating their skills and competences in a more positive manner than previous generations possibly due to changes in teacher education programs shifting from content-based to competence-based curricula. Additionally, the younger teacher generation has grown up with digital technology and experienced being online students themselves. Teachers who have experiences of studying online have been found to promote student-centered practices in their own online learning environments (Cox & Prestridge, 2020). Therefore, VET teachers' positive attitudes towards technology and the use of digital tools align with previous research findings that have shown significant relationships between teachers' beliefs about their digital competence and their positive beliefs regarding the ease of use and usefulness of technology in teaching (Antonietti et al., 2022).

Examining the results of overall VET teaching experience in years indicates that VET teachers with less than five ($n=60$) and up to 10 years ($n=53$) of teaching experience rated their competences in almost all seven aspects slightly higher than teachers who have been in the VET profession for a longer period (Table 3). This group of participants ($n=113$) may belong to a younger generation of teachers (Generations Y and Z), having gained confidence in using technology in different ways, thus, assessing their pedagogical digital competences accordingly higher than their older colleagues. In view of Krumsvik's model, it could be assumed that these VET teachers have easily achieved the first two levels of the model, adoption and adaptation, basic digital skills that focus on the transparent use of technology and gaining experiences and confidence to move on the next levels. However, a large group of the participating VET teachers ($n=105$) had a long overall teaching experience (11 years or more). Interestingly, they assessed themselves as having rather similar levels of competences in all seven sub-areas (Table 3). This may indicate that they have developed a solid level of pedagogical competences in general VET teaching that can be utilized and transferred even after 20 or more years of practice to online teaching. Thus, supporting Krumsvik's (2012) understanding of pedagogical digital competence development as being a journey that takes several years to reach the higher stages of appropriation and innovation.

However, experience in online teaching clearly corresponds positively to VET teachers' pedagogical digital competences. VET teachers with two or more years of experience in teaching online evaluated their skills higher than those with less experience (Table 3). It appears that experience in online teaching accelerates the development of pedagogical digital competence (PDC). It can be postulated that such experiences enable VET teachers to reach the highest stages of the model (Krumsvik, 2012), including the appropriation stage and the innovation stage to develop new pedagogical innovations using technology with an extended knowledge of learning. VET teachers with a pedagogical digital competence (PDC), have heightened self-awareness skills highlighting the dialectic relationship between "hands-on" and "heads-on" activities (Krumsvik, 2012) when using technology in VET education.

Overall, these results suggest that pedagogical digital competence (PDC) varies among VET teachers depending on their demographic and professional profiles. However, all VET teachers, regardless of age or teaching experience, are able to develop their PDC and demonstrate it in

their professional learning contexts. Gaining experience in online teaching appears to accelerate the development of PDC and confidence in working in digital environments. Therefore, the results suggest that VET organizations should provide opportunities for all VET teachers to engage in online teaching and encourage active experimentation with adequate resources, such as through pair-teaching or mentoring.

Implications and recommendations

It is acknowledged that this study has limitations. The selection of VET teachers and vocational fields was predetermined by the project partners, which may have influenced the results. Additionally, the study relied on self-reported competence assessments, which can be prone to under- or overestimation as no criteria descriptions were provided. While the aspects of PDC were measured based on VET teachers' subjective perceptions, incorporating measurements of the VET organizational environment would provide a more objective view. Future research should consider objective VET factors, such as digitalization strategy, digital learning platforms, and support offered to teachers, as pedagogical digital competence is not a phenomenon that exists independently of the context.

This study contributes valuable insights into VET teachers' pedagogical digital competences, which need to be continuously updated. By conducting a self-assessment survey, VET teachers' beliefs about their PDC, rather than their demonstrated actions, were measured. In conclusion, it is strongly recommended and encouraged that VET teachers build their confidence in using digital learning environments in vocational education and further develop their pedagogical digital competence.

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Appendix 1: Results of the Kruskal-Wallis test

Domain	Age group	Mean rank	Teacher experience in years	Mean rank	Experience in online/hybrid teaching	Mean rank
Web Content Production	35 or less (n=36)	125.56	Less than 5 years (n=60)	107.92	No experience (n=15)	52.39
	36-45 (n=57)	108.04	5-10 y (n=53)	107.82	Less than 2 years (n=102)	97.28
	46-55 (n=84)	94.9	11-15 y (n=29)	96.67	2-5 years (n=78)	111.56
	Over 55 years (n=35)	80.59	16-20 y (n=25)	97.43	Over 5 years (n=20)	116.83
	Do not want to share (n=6)	103.63	More than 20 years (n=51)	89.81	Don't know (n=3)	96
Planning online teaching	35 or less (n=36)	118.6	Less than 5 years (n=60)	89.75	No experience (n=15)	50.38
	36-45 (n=57)	94.19	5-10 y (n=53)	101.66	Less than 2 years (n=102)	80.14
	46-55 (n=84)	78.77	11-15 y (n=29)	88.71	2-5 years (n=78)	101.2
	Over 55 years (n=35)	70.17	16-20 y (n=25)	72.66	Over 5 years (n=20)	116.03
	Do not want to share (n=6)	110.63	More than 20 years (n=51)	83.29	Don't know (n=3)	90.33
Building interaction and teamwork	35 or less (n=36)	121.29	Less than 5 years (n=60)	95.93	No experience (n=15)	65.42
	36-45 (n=57)	96.19	5-10 y (n=53)	102.63	Less than 2 years (n=102)	85.25
	46-55 (n=84)	82.62	11-15 y (n=29)	92.85	2-5 years (n=78)	101.5
	Over 55 years (n=35)	72.05	16-20 y (n=25)	71.91	Over 5 years (n=20)	109.24
	Do not want to share (n=6)	124.63	More than 20 years (n=51)	84.51	Don't know (n=3)	67.83
Guidance in hybrid and online learning environments	35 or less (n=36)	127.53	Less than 5 years (n=60)	98.45	No experience (n=15)	50.85
	36-45 (n=57)	99.24	5-10 y (n=53)	104.86	Less than 2 years (n=102)	87.35
	46-55 (n=84)	81.52	11-15 y (n=29)	82.52	2-5 years (n=78)	105.29
	Over 55 years (n=35)	75.23	16-20 y (n=25)	71.11	Over 5 years (n=20)	109.32
	Do not want to share (n=6)	95.5	More than 20 years (n=51)	91.95	Don't know (n=3)	48.17

Domain	Age group	Mean rank	Teacher experience in years	Mean rank	Experience in online/hybrid teaching	Mean rank
Learning tasks	35 or less (n=36)	127.63	Less than 5 years (n=60)	98.18	No experience (n=15)	54.08
	36-45 (n=57)	102.23	5-10 y (n=53)	106.91	Less than 2 years (n=102)	86.28
	46-55 (n=84)	81.53	11-15 y (n=29)	100.62	2-5 years (n=78)	112.74
	Over 55 years (n=35)	84.64	16-20 y (n=25)	69.59	Over 5 years (n=20)	112.34
	Do not want to share (n=6)	132.63	More than 20 years (n=51)	92.76	Don't know (n=3)	60.25
Feedback and assessment	35 or less (n=36)	129.71	Less than 5 years (n=60)	102.22	No experience (n=15)	67.69
	36-45 (n=57)	107.62	5-10 y (n=53)	107.62	Less than 2 years (n=102)	92.4
	46-55 (n=84)	86.32	11-15 y (n=29)	108.04	2-5 years (n=78)	108.2
	Over 55 years (n=35)	79.4	16-20 y (n=25)	85.15	Over 5 years (n=20)	117.35
	Do not want to share (n=6)	107.5	More than 20 years (n=51)	85.74	Don't know (n=3)	20.5
Developing and sharing my own digital competence	35 or less (n=36)	130.97	Less than 5 years (n=60)	108.3	No experience (n=15)	64.46
	36-45 (n=57)	99.32	5-10 y (n=53)	109.35	Less than 2 years (n=102)	93.89
	46-55 (n=84)	90.86	11-15 y (n=29)	96.91	2-5 years (n=78)	105.9
	Over 55 years (n=35)	83.14	16-20 y (n=25)	75.07	Over 5 years (n=20)	119.82
	Do not want to share (n=6)	88	More than 20 years (n=51)	89.58	Don't know (n=3)	67.5

**ANALYSIS OF BUSINESS STUDIES TEACHERS' PERCEPTION OF
INFORMATION PROCESSING SKILLS REQUIRED IN SECONDARY SCHOOLS IN
DELTA STATE**

Akpomudjere Ovwiroro

&

Kelechi Raymond Okoye

ABSTRACT

With numerous global advancements in information processing skills, it is essential that teachers have a thorough working knowledge of information technologies (ITs) and their influence on the performance and engagement of their students. The purpose of the study was to analyze the perceptions of Business Studies teachers' information processing skills required for effective performance in Delta State (Nigeria). Survey research design was used in the study. Four research questions were posed to guide the investigation and four hypotheses were formulated and tested. The population of the study was 2,082 Business Studies teachers in Delta State. A simple random sampling technique was used to select 324 Business Studies teachers from 108 junior secondary schools from 9 Local Government Areas of Delta State. Data were collected by the researcher through the administration of the survey. The data were analyzed, and the findings from the study revealed that Business Studies teachers' information processing skills were not perceived as acceptable in terms of quality, adequacy or utilization. It was recommended that since information processing skills are an integral part of business studies in terms of teaching and learning, the findings of this study should serve as feedback for reforms in the system. Business Studies teachers with inadequate information processing skills should be trained and retrained by their employers and information processing technologies should be adequately and equitably supplied to all schools in Delta State.

Keywords: *Business education, information processing skills, analysis.*

INTRODUCTION

Business education is a course for and about business. At the junior secondary school level, it is called Business Studies. According to Ikegwani (2015), Business Studies prepares students for exploration of business and management services, for further education or for the world of work. Okolocha and Nwadiani (2014) stated that Business Studies is a subject that prepares and equips students with knowledge aimed at creating career awareness on saleable skills that will enable them to fit into the world of work with little or no difficulty.

Business education covers all fields related to administrative and managerial functions, and the levels of qualifications range from junior to executive positions. Business teachers play a very significant role in achieving student success. In appreciation of the teacher's vital role in the educative process, the Federal Republic of Nigeria (2013) acknowledged that no education system can rise above the quality of its teachers. Standard quality in this context depicts excellent performance in theory, practice and emulative attitudes. Hence, Adesina (2013) recognized teachers as the heart of any educational system. To further enhance the quality of education, Business Studies teachers should possess skills in emerging information technologies.

The Federal Republic of Nigeria (2013) has defined information processing skills as an art and applied science dealing with data and information, encompassing hardware, software, firmware, tools, methods, practices, processes, procedures, concepts, principles and sciences. These skills are necessary for performing information related activities such as acquisition, representation, processing, presentation, security, interchange, transfer, management, organization, storage and retrieval. According to Eriki (2014) information processing skills may be regarded as the combination of "informatics technology" with other related technologies, specifically communication technology.

The teaching profession in Delta State, a state in southern Nigeria, has been challenged with a series of problems. These problems include the quality, adequacy, distribution, and utilization of teachers in both public and private schools. Based on these problems, it appears that the majority of Business Studies teachers in the secondary schools lack the basic teaching qualifications, experience and proficiency which are required for effective education. This explains why the government, over the years, has embarked on concerted measures for improving the quality of teachers in the state secondary school system including in-service trainings, workshops and seminars.

Acknowledging the problems besieging the educational sector, Afe (2010) claimed that a major manifestation of the current educational crisis in Nigeria is the inability of the states to ensure an adequate supply of qualified teachers to all government-owned secondary schools. Currently, most of those employed to teach in the public secondary schools have no teaching qualification, and some teachers teach subjects outside their areas of specialization. This problem of inadequacy of qualified teaching staff and its negative impact on the educational sector has compelled education policy formulators to embark on drastic measures to address this situation, including equitable teacher distribution.

In support, Monk and Rice (2007) maintained that equitable teacher distribution could help ensure equal educational opportunities to all. This appears to be aligned with Nigeria's National Policy on Education which states that teachers are supposed to be equally distributed to schools. However, in Delta State, there appears to be inequality in teacher distribution in government-owned secondary schools among urban and rural areas. This leads to uneven teacher distribution with some schools being over-staffed while others are under-staffed in the core subjects, including basic technology. This problem is largely influenced by school locations as more teachers desire to be in urban schools.

With numerous global advancements in information processing, it is essential that teachers have a thorough working knowledge of information technologies and their influence on the performance and engagement of their students. It is important to note that without knowledgeable and experienced teachers, students cannot benefit from the educational opportunities afforded by technology. In short, teachers at all levels are expected to equip themselves with all necessary skills in all aspects of teaching, including information processing.

Unfortunately, most Business Studies teachers in Delta State secondary schools do not appear to possess adequate information processing skills. For instance, Akpomudjere (2014) and Yusuf (2014) reported low levels of information processing skills among business teachers in Delta State. Akpomudjere also reported that many business teachers in Delta State cannot operate multi-media equipment, computers and other communication devices for teaching and learning purposes.

The evolution of information technology requires that Business Studies teachers in Delta State fully equip themselves with information processing skills. Based on the reported deficiencies on the level of information processing skills possessed by teachers, there is need to assess Business Studies teachers' skills with regards to information processing. Skill, as viewed by Soanes (2001), is the ability to do something well especially as a result of long practice. Obi (2005) defined skill as manual dexterity acquired through repetitive performance of operations. Osinem and Nwaoji (2005) stated that skill is the proficiency displayed by someone in the performance of a given task. Analysis involves a systematic examination and evaluation of data or information by breaking it into component parts to uncover and understand relationships, thus providing a basis for problem solving and decision making. According to Eriki (2014), analysis can also be someone's opinion, based on their knowledge.

Statement of the Problem

The integration of information processing skills into teaching and learning processes has become a major challenge in Nigeria's educational system. This problem is more intense in subject areas like Business Studies. Hence, stakeholders have been calling on relevant authorities to ensure that the curriculum of business education gives consideration to information technology in relation to pedagogical activities. Ikegwani (2015) observed that Business Studies students lack basic information management skills and perform poorly in examinations in areas related to information processing skills.

Factors contributing to the poor performance of students, according to observation and available literature, include inadequacy of teachers, poor distribution of teachers with information processing skills, imbalanced teacher-student ratios, as well as teachers' attitudes towards embracing information technology. Based on these conditions, there is need to analyse the quality, adequacy, distribution and utilization of information processing skills of Business Studies teachers in Delta State.

Purpose of the Study

The goal of this study was to analyze Business Studies teachers' possession of information processing skills in junior secondary schools in Delta State. Specifically, the study was designed to analyze the:

1. Perception of Business Studies teachers on the quality of information processing skills required for effective performance in junior secondary schools in Delta State.
2. Perception of Business Studies teachers on the adequacy of information processing skills required for effective performance in junior secondary schools in Delta State.
3. Perception of Business Studies teachers on the degree of utilization of information processing skills required for effective performance in junior secondary schools in Delta State.
4. Perception of Business Studies teachers on the adequacy of teachers who possess information processing skills required for effective performance in junior secondary schools in Delta State.

Significance of the Study

The findings of this study would be of benefit to Business Studies teachers, the Federal Ministry of Education, professional organizations such as Association of Business Educators of Nigeria and Association of Vocational Technical Educators of Nigeria, curriculum planners, educational administrators and future researchers.

Business Studies teachers will benefit from this study since the results will identify the skills needed to teach effectively the topics involved in information processing. Further, the findings from the study will guide Business Studies teachers on the important skills they must possess to make them competent to teach information processing skills.

The Federal Ministry of Education will benefit from this study since the findings will provide useful information to the Ministry of Education and other agencies in their efforts to design and improve information processing curriculum for Nigerian students. Professional organizations will benefit from the study since the findings from the study will provide information on the skill levels of Business Studies instructors.

Scope of the Study

The study is on the analysis of information processing skills required by Business Studies teachers for effective performance in junior secondary schools in Delta State. The study focused on the quality, adequacy, distribution and utilization of information processing skills. The study is limited to core information processing skills, including web usage; internet and information surfing; multi-media communication; computer software development and usage; computer maintenance; computer operations, management and networking; as well as computer application usage.

Research Questions

The following research questions guided the study:

1. What are the perceptions of Business Studies teachers on the quality of information processing skills required for effective performance in junior secondary schools in Delta State?
2. What are the perceptions of Business Studies teachers on the adequacy of information processing skills required for effective performance in junior secondary schools in Delta State?
3. What are the perceptions of Business Studies teachers on the degree of utilization of information processing skills required by Business Studies teachers in junior secondary schools in Delta State?
4. What are the perceptions of Business Studies teachers on the adequacy of the information processing skills possessed by Business Studies teachers in junior secondary schools in Delta State?

Hypotheses

The following hypotheses were tested at 0.05 level of significance:

1. There is no significant difference in the mean ratings of Business Studies teachers on the quality of Business Studies teachers with information processing skills for effective performance in junior secondary schools in Delta State based on qualification.
2. There is no significant difference in the mean ratings of male and female Business Studies teachers on their perceived adequacy of Business Studies teachers with information processing skills required for effective performance in junior secondary schools in Delta State.
3. There is no significant difference in the mean ratings of Business Studies teachers on their perceived degree of utilization of information processing skills required for effective performance in junior secondary schools in Delta State based on years of teaching experience.

4. There is no significant difference between the mean ratings of male or female Business Studies teachers on their perceived adequacy of the information processing skills possessed by Business Studies teachers in Delta State based on age.

METHOD

This study adopted a descriptive survey research design. The geographic area for this study is Delta State. The state is comprised of 25 local government areas with the capital city located in Asaba. The State has 667 junior secondary schools with a teaching staff of 10,873.

Population for the Study

The population for this study consisted of 2,082 Business Studies teachers drawn from 667 existing junior public secondary schools in Delta State.

Sample and Sampling Technique

From the population of 2,082 Business Studies teachers, 324 Business Studies teachers were randomly selected from 108 junior secondary schools using the Krejcie and Morgan formula for determining the size of a random sample. The 324 Business Studies teachers were selected from nine local government areas to enhance accessibility and effective coverage. Three business studies teachers were selected from each of the 108 schools.

Instrument for Data Collection

From literature reviewed, the researchers designed and developed an instrument titled Business Studies Teachers' Information Processing Skills Questionnaire (BSTIPSQ). The instrument included two sections. Section A included demographic information of the respondents while Section B included the information processing skills, structured in a five-point Likert scale. The options were: Strongly Agree (SA) = 5 points; Agree (A) = 4 points; Undecided (U) = 3 points; Disagree (D) = 2 points; and Strongly Disagree (SD) = 1 point.

Validation of the Instrument

The face validity of the BSTIPSQ was verified by distributing a copy of the survey, along with the with purpose of the study, scope, research questions and hypotheses, to three university lecturers with expertise in vocational education, business education and measurement and evaluation. These experts, all from Nigerian universities, were asked to make suggestions that helped to modify the questionnaire in order to achieve its overall objectives.

Reliability of the Instrument

The Cronbach alpha method was used to establish the reliability of the BSTIPSQ. The validated BSTIPSQ was administered to 20 Business Studies teachers from Edo Secondary School, Itohan Grammar School, and Emotan secondary school in Edo State. The scores of these 20 teachers were subjected to a Cronbach alpha test. The test yielded an internal consistency coefficient of .95.

Methods of Data Collection

Copies of the BSTIPSQ were administered to the respondents in the sampled schools and collected from them by the researcher with the help of five teachers, from five different schools. All the 324 questionnaire administered to the respondents were completed and returned with valid information for a response rate of 100 percent.

Methods of Data Analysis

The research questions were analyzed using means and standard deviations while hypotheses were tested using independent t-tests and the analysis of variance (ANOVA) at .05 level of significance. The mean scores were used to provide answers to the research questions while standard deviations were used to show the spread in opinion around the mean values.

PRESENTATION AND ANALYSIS OF DATA

Research Question 1

What are the Business Studies teachers' perceptions on the quality of Business Studies Teachers' Information Processing Skills?

Table 1. Mean and Standard Deviation Ratings of Business Studies Teachers' Perception on the Quality of Information Processing Skills (N = 324).

S/N	Items	X	SD	Remarks
1	Multimedia application capacity	2.71	0.93	Undecided
2	Website design capacity	1.87	0.72	Disagree
3	Computer networking capacity	1.97	0.91	Disagree
4	Software development capacity	1.99	0.89	Disagree
5	Capacity to operate information processing equipment	2.21	1.05	Disagree
6	Capacity to communicate in variety of media for diverse audience	2.29	1.06	Disagree
7	Capacity to search for information	3.62	1.02	Agree
8	Capacity to locate information	3.22	1.15	Undecided
9	Capacity to discover new principles in information processing	3.04	1.24	Undecided
10	Capacity to apply technology with sensory skills essential in knowledge/information age	2.01	0.82	Disagree
Weighted Mean		2.49		Disagree

Table 1 presents the mean ratings of Business Studies teachers' perceptions on the quality of information processing skills. It is shown that the respondents disagree on most of the items. These findings could be interpreted that the quality of these skills among Business Studies teachers is below standard. The weighted mean of 2.49 indicates that the respondents disagreed on all the items.

Research Question 2

What are the Business Studies teachers' perceptions on the adequacy of Business Studies teachers with information processing skills? The data analysis related to Research Question two is summarized in Table 2.

Table 2. Mean Ratings of Business Studies Teachers' Perception on the Adequacy of Teachers with Information Processing Skills (N = 324).

S/N	Items	X	SD	Remarks
11	Capacity to operate information processing equipment	2.21	1.05	Disagree
12	Capacity to search for information	3.63	1.03	Agree
13	Website design capacity	1.87	0.72	Disagree
14	Software development capacity	1.99	0.89	Disagree
15	Multimedia application capacity	2.71	0.93	Undecided
16	Computer networking capacity	1.97	0.92	Disagree
17	Information storage capacity	2.48	1.03	Disagree
18	Capacity to retrieve information	2.58	0.92	Undecided
19	Capacity to discover new principles in information processing	3.04	1.25	Undecided
20	Internet scuffing capacity	2.71	0.97	Disagree
Mean of Means		2.52		Undecided

Table 2 presents the opinion ratings of Business Studies teachers regarding the adequacy of teachers with information processing skills. It is indicated on the table that the respondents agreed on only one item, could not decide on three items, and disagreed on six items. The weighted mean of 2.52 also indicates an undecided opinion on all the skills measured. This implies that the number of Business Studies teachers with information processing skills is not perceived to be adequate.

Research Question 3

What are the perceptions of Business Studies teachers on the utilization of information processing skills in Delta State?

Table 3. Mean Ratings of Business Studies Teachers Perception on the Utilization of Information Processing Skills by Business Studies Teachers (N = 324).

S/N	Items	X	SD	Remarks
21	Capacity to generate new ideas for solving information processing problems	2.13	0.81	Disagreed
22	Capacity to apply technology with sensory skills essential in knowledge/information age	2.07	0.86	Disagreed
23	Capacity to define problems in complex domains	4.07	0.76	Agreed
24	Capacity to acquire information	4.02	0.66	Agreed
25	Capacity to locate information	3.39	1.14	Undecided
26	Capacity to store information	2.58	1.03	Undecided
27	Capacity to retrieve information	2.68	0.94	Undecided
28	Capacity to use variety of modern communication tools	2.76	0.92	Undecided
29	Capacity to communicate in a variety of media for diverse audience	3.15	0.90	Undecided
30	Time management capacity	3.50	1.12	Agreed
Mean of Means		3.04	0.91	Undecided

Table 3 indicates that Business Studies teachers have undecided opinions on the utilization of five information processing skills, disagree on two, and agree on three. The cluster mean of 3.04 indicates undecided opinions of the respondents on the utilization of information processing skills. Based on the results, it may be concluded that teachers with information processing skills are not fully utilizing their skills.

Research Question 4

What are the Business Studies teachers' perceptions on the adequacy of the information processing skills possessed by Business Studies Teachers in Delta State?

Table 4. The Mean Ratings of Business Studies Teachers' Perception on the Adequacy of Information Processing Skills possessed by the Teachers (N = 324).

S/N	Items	X	SD	Remarks
31	Multimedia application capacity	2.71	0.93	Undecided
32	Website design capacity	1.87	0.71	Disagreed
33	Computer networking capacity	1.97	0.92	Disagreed
34	Internet information scuffing capacity	1.99	0.89	Disagreed
35	Software development capacity	2.21	1.05	Disagreed
36	Capacity to operate modern information processing equipment	2.29	1.06	Disagreed
37	Capacity to locate information	3.63	1.02	Agreed
38	Capacity to communicate in a variety of media for diverse audience	3.22	1.14	Undecided
39	Capacity to discover new principles in information processing	3.04	1.24	Undecided
40	Capacity to evaluate information	2.01	0.81	Disagreed
	Mean of Means	2.49	0.98	Disagreed

In Table 4, the ratings of Business Studies teachers shows that the respondents agree on only one skill as being adequately possessed. They disagree on six skills and remain undecided on three skills. The indication is that Business Studies teachers do not possess adequate information processing skills. This is shown in the weighted mean of 2.49. Therefore, it may be concluded that information processing skills possessed by Business Studies teachers in Delta State are not perceived to be adequate.

TEST OF HYPOTHESES

Hypothesis 1

There is no significant difference between the mean ratings of Business Studies teachers on the quality of Business Studies teachers' information processing skills in Delta State based on qualification (below 1st Degree, 1st Degree and above 1st Degree).

Table 5. ANOVA Test of the Difference Between the Mean Ratings of Business Studies Teachers on the Quality of Information Processing Skills, based on Qualification (N = 324).

Source of Variance	Sum of Squares	df	Mean Squares	F-cal	P-Value $P \leq .05$
Between	2727.32	2	1363.66	587.78*	.00
Within	743.44	321	2.32		
Total	3470.76	323			

Table 5 shows the test of difference between the opinion ratings of Business Studies teachers on the perceived quality of information processing skills based on qualifications. The test yields a F-cal of 587.70 and P-value of .00. Since the P-value (.00) is less than the significant level of the test (.05), the null hypothesis tested is therefore rejected. It implies that there is significant difference between the mean ratings of Business Studies teachers on the perceived quality of information processing skills possessed by Business Studies teachers in Delta State. Since the respondents differ significantly in their opinion, it may be concluded that the perceived quality of information processing skills possessed by Business Studies teachers is below standard.

Hypothesis 2

There is no significant difference between the mean ratings of male and female Business Studies teachers on their perceived adequacy of Business Studies teachers with information processing skills in Delta State.

Table 6. Independent t-Test on the Difference Between the Mean Rating of Male and Female Business Studies Teachers on the Perceived Adequacy of Business Studies Teachers with Information Processing Skills.

Group	N	Mean	SD	Df	t-value	p-value
Male	207	27.70	3.52	322	19.76*	.00
Female	117	20.74	1.91			

Significant at $P < .05$

Table 6 shows the test of difference between the mean opinions of male and female teachers on the perceived adequacy of Business Studies teachers with information processing skills. The

test yields a t-value of 19.76 and a P-value of .00. Since the alpha level of the test (.05) exceeds the P-value obtained, the null hypothesis tested is rejected. Hence, it implies that there is significant difference between the mean ratings of male and female business studies teachers on the perceived adequacy of information processing skills.

Hypothesis 3

There is no significant difference between the mean opinion ratings of Business Studies teachers on their perceived degree of utilization of Business Studies teachers' information processing skills based on years of teaching experience (10 years or less, 11 to 20 years, and 21 years and above).

Table 7. ANOVA Test of Significant Difference Between the Mean Ratings of Business Studies Teachers on Perceived Utilization of Information Processing Skills Based on Years of Experience.

Sources of Variance	SS	df	Ms	F	p-value
Between Groups	1538.39	2	769.19	109.98*	.00
Within Groups	2245.04	321	6.99		
Total	3783.43	323			

* Significant at $P < .05$

Table 7 presents the test of difference between the mean ratings of Business Studies teachers, based on years of experience, on the perceived utilization of information processing skills. The test yields a F-value of 109.98 and P-value of .00. Since the P-value of the test (.00) is less than the alpha level of the test (0.5), the null hypothesis tested is rejected; and this implies that there is significant difference between the mean ratings of Business Studies teachers based on years of experience.

Hypothesis 4

There is no significant difference between the mean ratings of male or female Business Studies teachers on their perceived adequacy of the information processing skills possessed by Business Studies teachers based on age. The data analysis related to this hypothesis is summarized in Table 8.

Table 8. ANOVA Test of Significant Difference Between the Mean Ratings of Business Studies Teachers on the Perceived Adequacy of Information Processing Skills Possessed by Business Studies Teachers Based on age.

Sources of Variance	SS	df	MS	F	p-value
Between Groups	2433.77	2	1216.88	271.16*	.00
Within Groups	1440.53	321	4.48		
Total	3874.30	323			

* Significant at $P < .05$

Table 8 shows the test of difference between the mean ratings of Business Studies teachers on the perceived adequacy of information processing skills based on age. It is indicated on the table that the test yields an F-value of 271.16 and P-value of .00. It can be seen on the table that the P-value (.00) is less than the alpha level of the test; hence, the hypothesis is rejected which means that there is significant difference between the mean ratings of Business Studies teachers on the perceived adequacy of information processing skills possessed by Business Studies teachers based on age.

Summary of the Findings

Based on the results of the data analysis, the study reveals that:

1. Overall, the respondents' perceptions of the quality of information processing skills of Business Studies teachers are poor.
2. Business Studies teachers' perceptions on the adequacy of information processing skills are poor.
3. Business Studies teachers' possession of information processing skills are perceived to be poorly utilized.
4. The information processing skills possessed by Business Studies teachers are perceived to be inadequate.
5. There was a significant difference between the mean ratings of Business Studies teachers' perceptions on the quality of information processing skills based on teacher qualifications.
6. There was a significant difference between the mean ratings Business Studies teachers' perceptions on the adequacy of information processing skills based on gender.
7. There was a significant difference between the mean ratings of Business Studies teachers' perceptions on the utilization of information processing skills based on years of experience.
8. There was a significant difference between the mean ratings of Business Studies teachers' perceptions on the adequacy of information processing skills based on age.

CONCLUSIONS

Information processing skills are essential for both Business Studies teachers and their learners. Application of these skills in teaching processes facilitates learning and helps students acquire the skills required for future ventures. However, as demonstrated by the results of this study, the adequacy, distribution, utilization and possession of these skills cannot be ascertained without the necessary information technology resources, including computers, being available to all teachers and students in all schools.

The relevance of information processing skills in education and for education should not be underestimated, and the challenges confronting the quality, adequacy, distribution and utilization of skills must be addressed by stakeholders. Therefore, there is need for cooperative efforts between governments, training institutions and the private sector to ensure that quality information processing skills are adequately possessed by Business Studies teachers. Teachers with these skills should be equitably distributed and utilized in the schools.

Recommendations

Based on the review of related literature and findings of the study, it is recommended:

1. The federal and state government should employ and train an adequate number of teachers with quality information processing skills.
2. Delta State government should provide incentives to teachers posted to rural areas of the state to motivate them to accept these assignments.
3. Business Studies teachers with inadequate information processing skills should be trained in their school systems through professional development programs.
4. The National University Commission (NUC) and National Commission for Colleges of Education (NCCE) should reemphasize the inclusion of information technology in teacher education programs, especially in business education (office technology management).
5. Federal and state governments should supply information processing equipment and facilities to all schools.
6. Training providers for information processing skills should review their programs so they remain current with emerging technologies and global workforce demands.

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REGIONAL WORKFORCE EDUCATION CENTERS IN THE GERMAN STATE OF SCHLESWIG-HOLSTEIN: PURPOSE, PROCESS, STRUCTURE, ADVANTAGES, AND CHALLENGES

Carsten Schmidtke

ABSTRACT

Since 2007, the German State of Schleswig-Holstein has authorized the creation of Regional Workforce Education Centers (RBZ) to streamline workforce development, train more highly skilled workers, support economic development, stimulate job creation, and improve cooperation between different types of vocational schools. This paper first describes the process of establishing such centers, their purposes and advantages, their relationship with local and state oversight bodies, and their administrative structures. Subsequent to that, the perceptions of teachers and administrators at one RBZ will be discussed.

INTRODUCTION

In 2007, the German State of Schleswig-Holstein amended its educational statutes to allow public vocational schools to cooperate and join together to form independent legal entities called Regional Workforce Education Centers (Regionales Berufsbildungszentrum or RBZ). These new institutions were authorized to enter into legally binding agreements without requiring approval from state oversight bodies as long as they continued to fulfill their public education mandates (Marwede, 2013b, 2017). The new regulations also stated that RBZs were free to earn revenue outside of school district appropriations by offering professional development courses to industry and spend such income as they saw fit. According to Marwede (2013a), the goal of the new law was to attract more employers to the state, allow schools to be more flexible in response to regional workforce education needs, and support lifelong learning to ensure an adequate supply of highly-skilled workers.

The original impulse behind this change can be found in innovative approaches to educational administration developed in the 1990s to align school-based workforce training with industry models, a 1999 award given to the Danish workforce education system by the German Bertelsmann Foundation, and a 2001 conference that discussed the need for and advantages of competency centers in regional workforce education networks (Marwede, 2013a). Further, a report by the Federal Ministry of Education and Research (Dobischat et al., 2003) helps explain the move toward the RBZ model. The authors debated whether vocational schools should become a factor in regional economic development and argued that there was much opportunity for reforming current efforts to coordinate regional workforce development and training to benefit industry and workers. Vocational schools were touted as the possible answer to help integrate school curricula and industry needs if they were transformed into regional competency centers that had the support of major stakeholders to function as clearinghouses for all types of workforce education and training.

The core responsibility of vocational schools in the State of Schleswig-Holstein has traditionally been to provide initial occupational qualifications, either as part of the dual system of schooling and apprenticeship or in the form of full-time school-based workforce education and training similar to the systems in other federal states. Competency centers were also touted as institutions that could ensure the continued high quality of professional development and lifelong learning options for incumbent workers and afford their students the opportunity to earn qualifications beyond their initial training. Potential clients would include vocational students and apprentices, working adults in small to mid-size companies, professional organizations, and industry. These centers would be able to save money by using existing facilities and established administrative structures for new programs but, Dobischat et al. (2003) cautioned, could be hamstrung by the fact that their instructors, although considered experts in their fields, might not have the time for or the interest in additional teaching assignments. In addition, they lacked the experience with earning and managing outside revenue.

The cooperation between industry and vocational schools is based on a desire to have workers attain further qualifications. Therefore, it is generally agreed that competency centers' activities must emphasize the development of professional knowledge, skills, and attitudes.

Further, workforce training and development programs that improve relationships with industry can also benefit traditional vocational students through increased opportunities for internships. Making such a system successful requires the development of a suitable strategic plan, a business model that delineates the use of revenue and the cost factors associated with the new activities, the inclusion of more than one type of school into existing regional development networks, and a more flexible legal environment (Dobischat et al., 2003). This article first aims to describe the workforce education system in the State of Schleswig-Holstein and the process of establishing and administering an RBZ. Subsequently, the perceptions of teachers and administrators at one RBZ, will be discussed to determine if any of the expected benefits have been realized.

The Workforce Education System in Schleswig-Holstein

Obtaining an initial occupational qualification in the State of Schleswig-Holstein takes place mostly within the so-called dual system. Over the course of two to three-and-a-half years, based on occupation, practical apprenticeship training happens on the job whereas theoretical knowledge is taught at vocational schools. They complete their training with a comprehensive theoretical and practical journeyman exam stipulated by national training plans and administered by local Chambers of Industry and Commerce. Students in a dual program must attend vocational school part time until they conclude their apprenticeship. In the case their apprenticeship contract is terminated, they must attend vocational school until they turn 18 and graduate by finishing all required subjects with a passing grade (Fünderich et al., 2021; Mielczarek, 2015).

An alternative route to an occupational qualification is in-school training, where classroom learning is supplemented with internships. Such schools are divided into five different types: Full-Time Vocational Schools, Occupational Grammar Schools, Advanced Technical Schools, Technical Secondary Schools, and Technical Academies. Full-Time Vocational Schools are considered an alternative to the dual system. They provide students with an initial occupational qualification through two years of full-time schooling, including internships. Programs are designed to expand students' general education knowledge and are considered equivalent to the completion of a dual system. These schools also offer three types of one-year workplace readiness programs for those unable to find an apprenticeship but hoping to try again (Fünderich et al., 2021). The Career Entry Course prepares young people who did not secure an apprenticeship or other training for the transition into formal workforce education. The Workforce Training Preparatory Year aims to help students develop the maturity and work ethic that they will need for successful training or employment. A Career Education Foundation Year teaches generic workplace skills that can be transferred into future apprenticeship programs (Clasen, 2015; Mielczarek, 2015).

Occupational Grammar Schools exist to give high-performing Intermediate Secondary School graduates, who have completed ten years of schooling, an opportunity to earn a university admission credential. The curriculum emphasizes content linked to careers in agriculture, computer science, nutrition, technology, economics, or health professions.

Instruction is focused on workplace skills, and teachers often have industry experience in the subjects they teach. Advanced Technical Schools provide continued specialized occupational training for incumbent workers. Applicants must have successfully completed an apprenticeship program under the dual system and have at least seven years' relevant work experience (Fünderich et al., 2021; Mielczarek, 2015).

Technical Secondary Schools are meant for those students who have completed an apprenticeship program under the dual system or have acquired qualifications from a full-time vocational school but wish to attend a University of Applied Sciences, an institution of higher learning that focuses on teaching applied professional skills. A Technical Secondary School's one-year programs are meant to expand the knowledge students acquired during their apprenticeships and have a more intensive general education curriculum than advanced technical schools.

A Technical Academy is similar to a Technical Secondary School and allows students to obtain a subject-restricted university admission certificate in their areas of specialization. Students must have completed twelve years of grammar school, earned a Certificate of Readiness for Universities of Applied Sciences, and finished a recognized apprenticeship program through the dual system. Five years' relevant work experience may be substituted for the apprenticeship requirement. Schooling focuses on general education topics and expands students' occupational knowledge (Fünderich et al., 2021; Mielczarek, 2015).

Implementation and Administration of Regional Workforce Education Centers

The challenge for the different types of vocational schools is their ability to adapt quickly to changes in regional economies, occupational requirements; evolving workplace technologies, fluctuating numbers of students, and a lack of student interest in technical occupations. To be able to react to such changes more effectively, the State of Schleswig-Holstein offered local vocational school districts the opportunity to integrate the different schools into regional workforce education centers (RBZ) that would unite programs under one roof or at least one administrative structure. These centers would continue to offer initial occupational qualifications and also provide professional development, further occupational qualifications, retraining for displaced workers as well as career development and basic occupational skills. Greater freedom for an RBZ in program development was argued to lead to better alignment with changing needs for further occupational qualifications in the regional economy without interfering with its public obligations of offering initial occupational training (Fünderich et al., 2021).

RBZs cooperate with the State through goal statements and are no longer subject to close supervision and micromanaging. They can collaborate independently with other education and training providers in the region (high schools, colleges, universities, industries etc.) and are allowed to apply for European Union grants and enter into partnership agreements. However, they remain public, non-profit institutions despite the fact that they are allowed to earn extra income. Instructors, parents, and students all have a voice in how the RBZ is administered (Marwede, 2013b, 2017; Ministerium, n.d.).

Reporting requirements for RBZs include descriptive statistics about the school, a discussion of whether the projected outcomes from the goal statements have been achieved, an accounting of the origin and use of all funds, a description of the implementation of any professional development programs, and anything else that was codified in the original goal statements. The economic plan consists of three parts: the success plan, which details revenues and expenses; the finance plan, which discusses investments; and the personnel plan with the number of employees, any changes in salary and benefits costs, and a comparison with costs from previous years (Ministerium, n.d.).

The job descriptions for school and administrative leadership roles include tasks and expectations pertaining to outreach, school development, educational leadership, quality improvement, personnel management, class scheduling, budget and administrative matters, committee work, accounting procedures and facilities management. The State Ministry of Education, Science, Research, and Culture must approve all educational and training programs, personnel costs exceeding annual allocations, and services offered (Ministerium, n.d.).

A number of committees exist to guarantee joint governance and input from stakeholders. The Pedagogical Committee includes teachers, parents, and students according to an apportionment formula. The committee's tasks are to discuss the implementation of state curriculum requirements; choose textbooks and other materials; develop guidelines for homework and exams; discuss cooperation with parents; decide on rules for extracurricular activities such as job shadowing, internships, or project weeks; and review and comment on complaints from parents or students if these concern the entire school. The Grade Conference includes the teachers for that grade, the president of the school's PTA, and the student body president for each grade. Grade conferences also approve all written comments to be made on students' semi-annual grade reports (Brümmer et al., 2014; Marwede, 2017).

Department Head Committee meetings discuss departmental cooperation, class schedules, committee memberships, PTA conference guidelines, potential conflicts with industry, and, of course, budget allocations. Regular meetings of the Administrative Council focus on topics such as departmental news, public relations efforts, personnel matters, the RBZ homepage, issues relating to RBZ events, funding of joint accounts, internal processes, clear assignment of teacher tasks and responsibilities, enrollment trends, career fairs and professional development. Another important topic is improving communication so that everyone feels as part of a whole rather than of a component school (Brümmer et al., 2014; Marwede, 2017).

In the State of Schleswig-Holstein, public school teachers are state employees. They are hired, fired, and paid by the State. Prospective teachers send their applications to the Ministry of Education, Science, Research, and Culture, which then assigns them to a school district. However, the RBZs have consultative power in hiring decisions. As a result of their status, teachers are represented to the RBZ administration by the Employee Advisory Council.

RBZ Financing

Money for an RBZ is allocated by local governments. Cities and counties create vocational school districts charged with the disbursement of funds and the oversight of RBZ spending. An RBZ receives two allocations, a current operational budget based on student headcount for facilities, maintenance, and supplies and an investment budget for everything that is needed in the long term such as software licenses, laboratory equipment and classroom technology. The RBZ has the authority to dispense these funds as needed. At the end of each fiscal quarter, a report is presented to the RBZ's Administrative Council (Brümmer et al., 2014).

Teacher and Staff Attitudes Toward the RBZ Model

Information about teacher and staff attitudes was collected at RBZ Technik in a large city within the State of Schleswig-Holstein. This RBZ was a particularly salient location because it had been formed by combining two vocational schools from separate locations, thus dealing not only with the usual RBZ complexities but also with the task of uniting two different institutional cultures.

The participants for this study were employees with administrative assignments at a technical RBZ in the German State of Schleswig-Holstein. Overall, fifteen participants were interviewed: principal (male, five years in current role), assistant principal for academic affairs (male, five years in current role), assistant principal for administration and finance (female, five years in current role), and twelve department heads (ten male, two females, all with more than ten years of teaching experience). Department heads were regular teachers given release time for their administrative duties. Semi-structured interviews of 45 to 60 minutes in length were conducted in person by this researcher on the RBZ's campus in each participant's personal office. Interview questions were standardized and open ended, meaning that every participant was asked the same set of questions designed to elicit more than a yes or no response. All questions asked for personal impressions, not for what participants considered to be true (Rossmann & Rallis, 2004).

The researcher asked the planned questions and developed the conversation based on participant responses. Probes were asked when greater clarity or elaboration was needed on an issue, and he also used follow-up questions to delve deeper into some of the participants' perceptions. Interview questions touched on the RBZ's history and goals, challenges during the implementation phase, programs, resources, collaboration, the financial situation, day-to-day operations, criteria for the RBZ's effectiveness, benefits, and goals for the future.

Data analysis was conducted as "content analysis" (Rossmann & Rallis, 2004, p. 198). The data from all participants was used to find answers to the original research participants' statements, and these categories and themes then led to the generation of meaning through interpretation. The first coding step, open coding (Flick, 2002; Patton, 2002), consisted of reading the transcripts line by line several times and jotting down first codes representing interesting and emerging ideas and possible items that might indicate patterns and themes. A Regional second

round of open coding was conducted to determine if any of the codes could be grouped together. Coding methods used in this step were initial coding and in vivo coding (Saldaña, 2009).

In the next step, interview transcripts with codes and initial categories clearly applied were refined and expanded in focused coding (Patton, 2002; Rossman & Rallis, 2004; Saldaña, 2009) to identify the categories that are most likely to provide answers to the research question. The final step, selective coding, was used to develop core categories or themes from the categories at hand (Flick, 2002). The researcher integrated the categories around such central ideas, once again working across categories to look for any connections that had gone unnoticed, and ended up with the themes of facilities, administration, relationships with the state, and financing.

Findings from the Interviews

Overall, the assessment from teachers and staff was unfavorable. Although some positive aspects of the RBZ model were pointed out, the disappointments and challenges greatly outweighed the benefits in the perception of participants. Administrators had hoped that the transition process would be faster. However, it had already been several years since this particular RBZ had been founded, and many legal and fiscal issues had yet to be resolved. Teachers felt that there had been much lip service at the beginning but insufficient action to back it up. One person pointedly stated he felt that they had all been sold a bill of goods. Another one observed that the only benefit had been a nice new building. Some teachers were candid that the RBZ as such made no difference in the job of the individual teacher and that not much had changed because of the RBZ.

Despite the overall attitude among teachers that finding advantages of the RBZ model would require a lengthy and detailed search for examples, a number of positives were noted. One major advantage was uniting the different types of schools under one roof, which made the boundaries between programs more permeable. It facilitated scheduling by allowing the assignment of teachers across school types as needed to teach classes and made classrooms, shops, laboratories, and equipment available to everyone, thus preventing a need to have duplicate facilities for each component school. The fact that facilities could now be shared and were fully occupied instead of often sitting empty had also pleased school district administrators. The availability of facilities and instructors additionally helped connect theoretical and practical lessons and strengthen their link.

Having everyone in one building improved communication because it was easier to find and talk to others; teachers and staff members got to know one another and collaborated in solving problems. Another advantage was that when teachers were on medical or maternity leave, the larger number of teachers across several schools made it easier to find substitutes and adjust schedules. Some also felt that the RBZ was better for students because of better articulation among component schools. Students could now see and evaluate their options better instead of simply being told about them and having to rely on someone else's word.

A few other positives were administrative in nature. The main one was said to be fiscal independence, but a question was raised simultaneously whether the overall cost of switching to the RBZ model was worth giving RBZs what was perceived as limited freedoms at best. Legal independence was also seen as having some administrative advantages because people could assume more responsibility for their own areas, which meant that they could implement positive changes without having to go through multiple approval levels. However, according to those interviewed, such positives were often negated by the challenges and extra work they created.

The biggest problem in the eyes of teachers and administrators was the relationship with the State Ministry of Education, Science, Research, and Culture. At one time, there had been a separate Division for Workforce Education within the Ministry, but now there was a Division of Public Schools and Workforce Education with only about half the number of staff as before the reorganization. This reduction in staffing made it appear that no one was in charge of ensuring that vocational education policies and structures were applied consistently across the State. As a result of this, the policy alignment between counties and cities had weakened because each RBZ had stepped into the breach that had been created, leading some RBZ principals to regard all local vocational education as their personal spheres of authority. Besides the impression that the Ministry was no longer interested in vocational education, it also appeared that it now lacked expertise and no longer employed specialists educated and trained in the field. Several participants stated that there once again needed to be more focus on vocational education at the Ministry, and especially politicians needed to recognize the status of the RBZ as a workforce education institution that benefits the entire State. They also needed to understand that each RBZ operates in different political and economic environments and that RBZs cannot all be treated the same simply because doing so might be cheaper.

Many of the details surrounding the rights and responsibilities that would give RBZs more independence had yet to be worked out by the Ministry. Some responsibilities had officially been transferred to the RBZs, but the Ministry had trouble letting go and still tried to maintain control. One such area was hiring. In the past, vocational schools had had the option to hire temporary or part-time substitute teachers on short notice, but in the transition to the RBZ model, the Ministry took control of the hiring process once more. It agreed in principle that allowing an RBZ to hire its own teachers and write its own employment contracts would make matters much easier, but little progress had been made on that front. An RBZ technically has the right to hire its own teachers, but it must use the Ministry's job pipeline, that is, those teachers who already have submitted employment applications to the ministry get precedence. As those teachers are generally interested only in permanent full-time employment, finding part-time or temporary teachers on short notice has become all but impossible. In addition, using the Ministry's system, completing the hiring process can take up to two years, making flexible reactions to increased enrollment impossible. The opinion was proffered that the Ministry seemed to have looked at the RBZ model primarily as a way to save money.

Although teachers appreciated the increased exchanges between the different types of schools, they also felt that existing opportunities were not properly advertised and encouraged. Others were more jaded about the exchange of instructional personnel. They spoke about tension and

mistrust between teachers from different schools, the scheduling problems that arose when one's own teachers were otherwise engaged and difficult to get a hold of, and a lack of clarity about whom teachers should report to, often forcing them to deal with more than one supervisor and set of expectations. The focus remained mostly on one's own bailiwick, and the opportunities of collaboration were not fully realized. Some areas were even said to have closed themselves off from the rest of the RBZ and rejected all attempts at collaboration, which made the cross-school deployment of teachers even harder than it already was. These challenges led to the perception that the exchange of best practices was also limited although RBZ administrators saw the matter much more positively and spoke positively about how communication and collaboration had been improving.

The same perception existed in matters of recruitment and advertising. Instructors generally felt that the articulation between schools was not systematically communicated because each school wanted to attract students only to its own programs, and students were often not informed about different ways of continuing their education and training. As a result, public relations staff struggled to develop a consistent message for the entire RBZ rather than for its individual component schools and programs.

Department heads had hoped that the transition to an RBZ would lead to more revenue generation through professional development and consulting activities, but that had not been realized. Part of the reason had been stiff resistance from other providers of incumbent worker training and industry consulting who saw (and still see) the RBZ as a competitor. The other providers argued that if an RBZ entered the professional development market, they would have to price their services so low that they would no longer be able to pay their staff. Another issue was that RBZs are not allowed to set their own prices; for example, if teachers are used as after-hour instructors for professional development, their hours must be billed as a percentage of their monthly salary, which makes pricing uncompetitive in the market.

A major issue that had remained unresolved with financing was that budget allocations were often deferred for several months. Budgets for the calendar year were frequently not finalized until sometime in April or even July, which meant that an RBZ often could not make any investments or purchase supplies until September. Although the budget had technically been approved, the actual funds had not yet been disbursed, leading to a lack of certainty for administrators and department heads. In addition, the school district still tried to micromanage the RBZ's budgeting—the RBZ was supposed to be independent, yet the district continued to tell staff which accounting procedures to use or how to spend their allocated monies. Although the school district had transferred many administrative tasks to the RBZ, it now mandated extensive reporting and accountability measures, which increased the paperwork burden and the workload for teachers and administrators. For example, if supplemental funds were needed because regular allocations were insufficient or had not yet been released, the paperwork was seen as extremely onerous, and RBZ teachers and staff felt humiliated as they perceived they essentially had to go beg the school district for money. It did not help that the online system used to create and upload balance sheets had a steep learning curve and required extensive background knowledge in finance, something in which no one at the RBZ was fully trained and degreed.

DISCUSSION AND CONCLUSION

Despite the fact that both teachers and administrators were able to readily identify some of the positive aspects of being part of an RBZ, their overall experience was one of frustration with the slow progress and the amount of time and effort needed to make the RBZ function effectively and of skepticism about their ability to trust their colleagues fully. Issues seemed to stem from the interaction of some of the basic processes of organizational development: communication, organizational culture, decision making, and change management (Greenberg, 2010; Rae, 2008).

Overall, the participants felt that the change management efforts, especially on the part of the State Ministry and the school district, had been left wanting. Leaders may have performed their due diligence required by law, but teachers felt that these communication and consultation efforts had nonetheless been insufficient. Participants perceived that they were only superficially consulted in the determination of the current organizational state, the desired new structures, the implementation of innovations, and the desired future results. Impediments to change were not sufficiently properly addressed, and the excitement about saving money and the ability to make money, as surmised by some teachers, led State and district leaders to get carried away with change promotion techniques that rolled over teacher concerns. Was it, for example, really not foreseeable that other professional development providers would resist the RBZ mission and hinder efforts of expanding incumbent worker training? In addition, not properly consulting with teachers can lead to behavior such as “quiet quitting” or “work-to-rule” or other passive -aggressive forms of resistance, even well after the implementation phase has concluded (Serenko, in press). More research is needed to shed light on how messages were encoded and decoded to sell the idea of the RBZ, how information may have been filtered to emphasize only the positive, and where teachers should have been involved more extensively. Answers to these questions may also hold clues to the current state of affairs and can help remedy and prevent obstructive and antagonistic behaviors.

In addition, decision processes must be evaluated. Which decision-making approaches are used at the RBZ, and how do these processes impact the relationships between departments and the administration, between the administration and teachers, and among teachers in general? How do teachers and administrators perceive current decision-making processes and their impact on attitudes toward the RBZ as a whole? Have the processes improved or slowed the integration of schools, programs, and teachers? Investigating this question is salient because this particular RBZ was created by the merger of two separate organizational cultures. Are these differences properly reflected in decision processes? What can we learn from this example for the establishment of future RBZs?

Overall, the steps of planning and implementing the RBZ model and establishing an actual center are clearly delineated in the law and in other documents from the State Ministry, but it appears that the excitement about the new centers and the possibility of saving money led to some imprudent and rash decisions that moved the process forward and created unexpected new problems. The RBZ where this research took place, for example, has certainly made some strides in realizing the potential of the model, yet the lack of sufficient consultation, the failure

to truly unite two organizational cultures, and the lack of transparency in original decision-making processes have led to a situation where teachers grudgingly and sometimes gladly cooperate but still lack trust in their colleagues. This situation will likely take more time than expected to resolve and requires a sober assessment that despite the potential benefits of the RBZ models, time taken for extensive consultation with various stakeholders, even if this prolongs planning and implementation, is time well spent. This time is needed to prevent future obstacles that may actually create new rifts between the different groups of teachers and staff coming together for the benefit of their students and of regional economic development.

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Publication Guidelines for the *International Journal of Vocational Education and Training*

The *International Journal of Vocational Education and Training* reflects regional contributions and is international in scope. Its purposes are to provide a forum for the discussion of vocational education and training issues and practices; to assist in the dissemination of information on research and practice; and to strengthen the lines of communication among individual researchers and practitioners, institutions, and organizations. In addition, it provides a platform for individual views on relevant issues.

The Editorial Board passed a resolution requiring membership in IVETA in order to publish in the Journal, with effect from Volume 14.2. The Journal publishes feature articles on research, theory, and practice broadly related to international vocational education and training. The largest section of the Journal is devoted to empirical research articles. General articles and research manuscripts submitted for publication should be between 1,200 and 5,000 words in length and should adhere to rules in the most recent edition of the Publication Manual of the American Psychological Association (APA) with the exception of placing tables in-column in the text where you prefer them to appear. Articles should deal with some relevant aspect of educational opportunity such as educational research, evaluation, instruction, teaching methods, policy making, or theoretical discourses related to education and training.

In addition, the Journal solicits book, test, and computer hard/software reviews (500-700 words) and research in brief manuscripts (800-1,200 words) with similar publication goals. Authors interested in submitting a manuscript are required to follow the APA format as noted above.

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General Articles and Research Manuscripts. General articles and research manuscripts must be between 1,200 and 5,000 words long, or not more than 25 typed pages (double-spaced). Authors should keep tables and figures to a minimum and include them in-column at the appropriate point(s) of insertion. Emphasis is placed particularly upon manuscripts that are research-oriented.

Cover Page and Title. Authors must include a removable cover page that is attached to each manuscript. This cover page should include the title of the manuscript and the name, address, phone number, email address, and institutional affiliation of each author. The title should be no more than 12 words.

Abstract. An abstract describing the manuscript should be included on a separate sheet. The abstract must be less than 120 words. Please follow APA guidelines when writing the abstract.

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- Financing TVET
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- New and emerging practices in TVET
- TVET as continuing or lifelong Learning
- Transfer of Training
- Formal, Informal and Non-formal TVET
- TVET policies at local, national, and international levels
- Occupational competencies and TVET
- National Vocational Qualifications and Occupational Standards
- Occupational Certification, Licensing, Accreditation, and Micro Credentialing
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