CASE STUDY OF AN EXCELLENT TVET INSTITUTION\textsuperscript{1}:

Busan Meister Technical High School, Korea

By

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\textsuperscript{1} This case study has been conducted with the support of Korea-World Bank Partnership Facility Grant to promote job creation and skills development in the East Asia region. It aims to provide an example of an excellent TVET facility, as model for TVET reforms in the EAP region.
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**Background**

**Context and Purpose of the Study**

East Asian countries are among the fastest growing economies in the world over the last decade. However, as growth continues, the countries in East Asia are faced with a skills shortage and mismatching that has limited their economic growth. To tackle this issue, regional governments are currently restructuring their respective TVET systems to guide schools towards demand-driven education and training; and in order to do so, they have researched the best method of restructuring their respective systems.

In this context, the East Asia Education team has embarked on an in-depth study of “Excellent Institutions” by selecting particular outstanding cases in select countries of East Asia in order to research: (1) which factors contribute to a particular school’s successful outcomes; (2) how the school developed its demand-driven system; and (3) how the school utilizes finite resources to enhance school performance.

Therefore, the purpose of this study is to provide policy makers with empirical evidence that will be used to develop new policies that direct schools towards more market-responsive and demand-driven approaches. Specifically, it aims to; (1) offer guidance for individual institutions to develop innovative methods to improve the internal and external efficiency of their programs and determine resource priorities; (2) provide the World Bank with empirical evidence to guide the knowledge services it offers client countries in regards to TVET policies and practices; (3) engender a productive dialogue on the improvement of TVET relevance within the EAP region.

**Literature Review**

**Definition**

The definition of excellent is measured by the school’s internal and external efficiency. **Internal efficiency** refers to the relationship between the inputs and outputs and focuses on what occurs within the educational and training processes. Then, what happens to the outputs of the training process in relation to economic and social requirements is defined as **external efficiency**, which is also referred to as relevance of the program (Johanson and Adams, 2004). Therefore, the excellent TVET institutions produce the best training outcomes by retaining high internal efficiency.

**Premised Four Factors Contributing to School Outcomes**

Based on the literature review, the study premises that a school becomes excellent when it (1) conserves adequate resources; (2) delivers relevant programs; (3) develops an effective management system; and (4) establishes linkages with enterprise in the three previously discussed areas. Additionally, there are external factors impacting the success of schools, called “ecosystem factors” (Altbach and Salmi, 2011).
Research Design and Method

Research Questions

By conducting an in-depth analysis, this study seeks to find: (1) whether or not the above premise factors impact school outcomes; and if so, then, (2) which of these factors is the determining factor that contributes most to the enhancement of school performance and in what context (various settings and time periods within respective countries); and (3) how this factor can be strengthened based on suggestions from teachers/instructors and school administrators.

Conceptual Framework

Diagram 1 - The Theoretical Framework

Source: author’s construction

The Rationale

We will reversely examine the relationship between outcomes and premise factors by selecting a high-performance school (purposely selecting the sampling procedure) and the impact of the premise factors on graduate employment rates. The logic is that if this high-performance school demonstrates a showing of all these factors, then we can conclude that these premise factors are likely to raise employment rates.

Case Selection

The following shows three areas of consideration for the case selection process in our study.

First, as we are reversely testing the factors that are assumed to be contributing to a school’s success, we will select excellent schools with exemplary outcomes. Second, we will select the school at both the secondary and post-secondary levels within the same sector. In this way, we can more easily compare how different levels of skilled graduates are absorbed into the labour market within the same sector, thereby investigating whether “different levels of skills” is one of the ecosystem factors positively impacting school excellence. Also, this analysis may provide some suggestions on how to attract more students in vocational high
school, especially to countries where students’ vocational track preferences are low. Third, we will select schools that provide skills training for sectors that may best represent the select country’s economy. In this way, lessons learned from the case study can be tailored to meet the specific needs of a country that may be considering introduction of TVET training for the same sector.

In Korea’s case, Busan Meister Technical High School (BMT) was selected because it meets all three criteria.

Data Collection Process

The study will collect data from multiple sources to increase validity of the study. The sources include: (1) archived information and quantitative measures; (2) a survey; and (3) interviews.

The Survey

The survey was conducted with students, teachers, vice principals, and the principal. For the students, we excluded 1st grade students, as they are assumed to have a lack of learning experiences with BMT (Korea’s school year starts in the first week of March, and this survey was conducted during the second week of April). 555 students (277 2nd graders and 278 3rd graders) out of the total number of 600 (300 for 2nd and 3rd grade) responded to the survey.

For teachers, we excluded administrative staff, because they are assumed to have no knowledge of the school’s program. 107 teachers (the principal, two vice principals and 104 teachers) responded to the survey out of the total number of 113 teachers.

With structured questions (category or ranking), the survey questionnaire is designed to directly address whether or not the schools retain each factor (resources, teaching, management, and linkage with industry) and these factors’ impact on school outcomes.

The sample of the survey questionnaire is attached in Annexes 1 and 2.

The Interview

In order to conduct an in-depth analysis, interviews were conducted with 10 students, 10 specialty teachers, the principal, and one vice principal. The interview question types were structured to investigate the association between the premise factors and the factor most effective in enhancing school outcomes and how this identified factor can be improved. A sample of the interview questions is attached in Annex 3 and 4.

To maintain the validity and reliability of the study, we collected multiple resources to investigate the research questions.
About Busan Meister Technical High School (BMT)

History

BMT was founded in 1967 by the government to supply skilled workers to Korea’s newly established industry, and since then, the school has produced 28,415 graduates (as of 2015) in the field of mechanical engineering. The school became a Meister High School in 2009, and accordingly, it reorganized the program and class into Precision Machine 3 classes, Mold Design 3 classes, Shipbuilding and Machine 3 classes, and Robot Tech 6 classes. Since 2012, the new principal, Dr. Lee, the first principal elected via public contest, has begun a series of reforms within the school system in order to meet new industry demands for the 21st century global economy.

Educational Goals

The school’s vision is to help students become future industry leaders through self-development. The educational goal is to produce Young Meisters who are self-motivated and have problem-solving skills and warm hearts. More specifically, the school focuses on: 1) developing basic occupational competencies and problem-solving skills; 2) combining academic knowledge with industry-specific technical skills; providing students with an excellent learning environment; 3) and ensuring teacher competency.

Strategies (Big 3+4 Links)

In order to achieve this goal, BMT articulates its strategy of “Big 3 [Humanity, Creativity, Teamwork] plus 4 Links [Strengthening Basic Job Skills, Strengthening Project Design Education, Strengthening the system of learning portfolio, Strengthening numerical, and foreign language skills]” (Diagram 2).

Diagram 2 Big3 plus 4Links
Diagrams 3, 4, and 5 provide detail on each of the four links.

**Diagram 3 Strengthening Basic Job Skills**

1. **Promotion of Learning Motivation**
   - Aptitude test
   - Competition for Idea

2. **Certification of Basic Skills**
   - My Study Portfolio
   - Competition for Foundation Club

3. **Internship**
   - In-company training
   - Competition for the product

4. **1st year**: Students incubate and actualize ideas

5. **2nd year**: Students are trained by teachers and present their ideas

6. **3rd year**: Students present their product

**Diagram 4 Strengthening Education Project Design**
Diagram 5  Strengthening the system of learning portfolio

Four Majors

Since 2009, the school has reorganized its majors, the number of classes, and the number of students in each class. Currently, the school offers four majors: Precision Machining, Mold Design, Shipbuilding and Machining, and Robot Tech; each major includes three classes, except for Robot Tech which has six classes, and each class has about 20 students (Table 1).
Table 1: BMT Students

<table>
<thead>
<tr>
<th>Department</th>
<th>First year</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Classes</td>
<td>Students</td>
<td>Classes</td>
<td>Students</td>
<td>Classes</td>
<td>Students</td>
<td>Classes</td>
<td>Students</td>
</tr>
<tr>
<td>Precision Machine</td>
<td>3</td>
<td>61</td>
<td>3</td>
<td>60</td>
<td>3</td>
<td>59</td>
<td>9</td>
<td>180</td>
</tr>
<tr>
<td>Mold Design</td>
<td>3</td>
<td>61</td>
<td>3</td>
<td>61</td>
<td>3</td>
<td>61</td>
<td>9</td>
<td>183</td>
</tr>
<tr>
<td>Shipbuilding and Machine</td>
<td>3</td>
<td>61</td>
<td>3</td>
<td>61</td>
<td>3</td>
<td>59</td>
<td>9</td>
<td>181</td>
</tr>
<tr>
<td>Robot Tech</td>
<td>6</td>
<td>121</td>
<td>6</td>
<td>122</td>
<td>6</td>
<td>120</td>
<td>18</td>
<td>363</td>
</tr>
<tr>
<td>Total</td>
<td>15</td>
<td>304</td>
<td>15</td>
<td>304</td>
<td>15</td>
<td>299</td>
<td>45</td>
<td>907</td>
</tr>
</tbody>
</table>

Source: [http://bmt.hs.kr/](http://bmt.hs.kr/)

Department of Precision Machining

The students in this major learn basic knowledge of machining technology and mechanical drawing and obtain technical skills in the areas of machining tools and computer-aided technology. During the school year, the students acquire certificates of computer-aided milling, turning and mechanical drawing. Affiliate companies include Korea Hydro-nuclear Power, Samsung, Hyundai Motors, Hyundai Heavy Industry, Posco, Hanhwa, and Seongwoo Hightech.

Department of Mold Design

The students learn basic knowledge of material science, machining technology, mechanical drawing, and mold and die structure. They also obtain technical skills in the area of the design and making of injection mold and press die. The students obtain certificates in this area and can work at the companies in the field of airplane, automobile, and industrial machinery. Affiliate companies include Korea Hydro-nuclear Power, Samsung, Hyundai Motors, Hyundai Heavy Industry, KAI, East West Power, Korea Gas Co., and Shinhan Mold and Die.

Department of Shipbuilding and Machining

The students learn basic knowledge of the shipbuilding industry and obtain technical skills, such as electric welding, ship welding, plant plumbing, mechanical maintenance, robot welding, air-conditioning facilities and refrigerating machinery, gas, and energy control. The students obtain certificates in the previous areas and can work at the companies in the fields of shipbuilding, plant industry, air-conditioning and refrigeration, construction facilities plumbing, and shipbuilding equipment manufacturing. Affiliate companies include Korea Hydro-nuclear Power, Hyundai Heavy Industry, KAI, East West Power, Korea Gas Co., Samgang MNT.

Department of Robot Tech

The students learn basic knowledge of electricity, electronics automation and machine design and obtain technical skills in the area of robot design, automation machinery design, power facilities design and making, etc. The department is composed of three sub-majors, Robot,
Mechatronics, and Electricity. Affiliate companies include Korea Hydro-nuclear Power, Samsung, Hyundai Motors, Posco, East West Power, Seongwoo Hightech, Nara Corporation, South East Power, and Hyundai Relay Industry, etc.

Outcomes

BMT has showed very high graduate employment rates particularly after being transformed into a Meister High school. As shown in Table 2, until 2009, its graduate employment rate was between 45% and 55%. However, since 2010, the employment rate has increased to 83% when the school reformed its organization and programs to apply for Meister High School. Since 2013, when the school produced its first Meister High School graduates, the graduate employment rate has increased to above 90% (Table 2).

Table 2: Graduate Employment Rate (%)

<table>
<thead>
<tr>
<th>Year</th>
<th>~ 2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013 (1st graduate of Meister)</th>
<th>2014 (2nd)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employment Rate (%)</td>
<td>45-55</td>
<td>55</td>
<td>83</td>
<td>85</td>
<td>89</td>
<td>90.72</td>
<td>90.44</td>
</tr>
</tbody>
</table>

Table 3 shows the details in the employment of 2014 graduates. About 40% of the students are hired by public enterprises and large companies, while about 50% are hired by SMEs. Finally, less than 10% of total graduates joined the Korea International Cooperation on Agency (KOICA) as volunteers, working at training institutes founded by KOICA in developing countries. By major, Precision Machine shows a very high employment rate, while Shipbuilding and Machine shows the lowest employment rate. Considering its larger number of students, compared to the other three majors, Robot Tech also shows a high employment rate, particularly in public enterprises and larger companies most pursued by BMT graduates (Table 3). According to the survey conducted by BMT, the majority of students (70%) responded that their plan after graduation was either employment with large companies (35.6%) or public enterprises (34.8%), while 21.5% responded that they were planning to work at SMEs (21.5%) (Educational Planning, 2015, BMT).
Table 3: Employee Status of Graduates (2014)

<table>
<thead>
<tr>
<th>Department</th>
<th>Students</th>
<th>Employment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Public enterprises</td>
</tr>
<tr>
<td>Precision Machine</td>
<td>57</td>
<td>5</td>
</tr>
<tr>
<td>Mold Design</td>
<td>60</td>
<td>13</td>
</tr>
<tr>
<td>Shipbuilding and Machine</td>
<td>60</td>
<td>12</td>
</tr>
<tr>
<td>Robot Tech</td>
<td>121</td>
<td>21</td>
</tr>
<tr>
<td>Total</td>
<td>298</td>
<td>51</td>
</tr>
</tbody>
</table>

Source: [http://bmt.hs.kr/](http://bmt.hs.kr/)

BMT has achieved various skill awards since its establishment, and the number and type of awards for Skill Competition is presented in Table 4. Until 2014, 1,069 BMT students achieved the awards for local Skill Competition, 303 achieved National Competition and 36 achieved International Competition. This result indicates that BMT students have been trained as top skilled workers, which also increase their chances of employment upon graduation.

Table 4: Awards for Skill Competition (until 2014)

<table>
<thead>
<tr>
<th>Yr</th>
<th>Local Competition</th>
<th>National Competition</th>
<th>International Competition</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Gold</td>
<td>Silver</td>
<td>Bronze</td>
</tr>
<tr>
<td>~ 2013</td>
<td>363</td>
<td>284</td>
<td>243</td>
</tr>
<tr>
<td>2014</td>
<td>8</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Total</td>
<td>371</td>
<td>294</td>
<td>253</td>
</tr>
</tbody>
</table>

Source: [http://bmt.hs.kr/](http://bmt.hs.kr/)

The teachers believe that their students are highly competent. During the survey conducted by the Bank, 101 teachers (96%) of BMT teachers believe (either strongly agree or agree) that their students are highly competent (Graph 1), and 87 teachers (97%) of teachers believe (either strongly agree or agree) that the school is attractive to these highly competent students. In fact, during the interview, teachers pointed out a “virtuous circle”, indicating that because the school shows successful results, not only a high employment rate but also a high chance of being employed at prospective companies, the school is very attractive to competent students who can easily obtain skills during the school year. With the school’s best inputs, these competent students acquire a high skill that increases their chances of being employed, particularly at the prospective companies. As a result, the school produces successful outcomes again.
Graph 1: My students are highly competent

![Graph 1](image)

Graph 2: The school is attracting highly competent students

![Graph 2](image)

As the graduate employment rate is an outcome indicator in this study, BMT is assumed to be an excellent school. Next, we will reversely examine whether or not the school possesses all these factors: [(1) adequate resources; (2) relevant programs; (3) an effective management system; and (4) school-industry linkages], then we can conclude that these premise factors are likely to raise the employment rates.

Findings

In this paper, ‘excellent TVET’ institution’ means that it helps its students to transition smoothly into the labor market upon graduation by inputting adequate resources. BMT teachers also share this definition. They stated that ‘excellent school’ means that the school produces a high employment rate, and in order to do so, the school requires competent teachers, demand-driven programs, and well-established school-industry linkages. The teachers pointed out that skills currently required by industry include problem-solving skills, basic technical skills, and education of humanity, such as adaptation, work ethic, diligence, and consideration for others.

The teachers described an excellent school as a “virtuous circle.” If the school inputs the above resources and uses them efficiently, then, the more students become employable,
which in turn results in a graduate employment rate increase. Then, the outcomes increase the school’s brand power, which attracts more competent students and better teachers. Also, when the school produces high employment rates, it receives more financial support from the government, which enables the school to acquire and retain expensive equipment and practical training facilities. Also, with the high social recognition attached to the school of being a top performing school, more companies are interested in hiring BMT graduates. Therefore, they believe that BMT entered this virtuous cycle and has its high brand power.

The students shared the same view with the teachers. During the interview, all students agreed that BMT is an excellent school because of the school’s high employment rate, especially with the prospective companies. The students stated that the factors contributing to the high employment rate of BMT are the good teachers and facilities, and the school’s well-established school-industry cooperation. In addition, some students pointed out the school’s reputation, tradition, and alumni support, and others mentioned the school’s strong emphasis on employment with the provision of various employment service programs, such as field trip to companies.

All students stated that they choose to attend BMT because they believe that BMT would be able to help them secure a job with prospective companies upon graduation. Currently, they are generally satisfied with their choice.

Factor 1: Adequate Financial and Human Resources

Financial Resources

The students are satisfied with the school’s facilities and equipment and with their teachers, whom they believe are competent in their technical and teaching skills and actively help them secure jobs. The school continually provides them with information on companies. Also, considering Korea’s high youth unemployment rates, the school is still able to maintain its high

BMT is overseen by three government agencies: the Ministry of Education, the local education office of Busan local government, and the Small and Medium Business Administration (SMBA). SMBA is the main agency that provides annual funding to BMT, and it also funds two other Meister High Schools for the purpose of producing and supplying adequate skilled workers to SMEs. The details of BMT’s budget (2015) are illustrated in Table 5. In regard to revenue, the government (SMBT and the provincial office) provides about 60% of the total revenue followed by parental support. In regard to expenditure, the school spends the most on students’ welfare, including dormitories and food followed by administration. Given the high costs for teaching services, the school also spends 16% of its total budget on teachers’ wages. More than 20% of the total budget is allocated to the curriculum development.
Table 5: Budget of 2015

<table>
<thead>
<tr>
<th>Revenue</th>
<th>Expenditure</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>The central government (SMBA)</strong></td>
<td><strong>Human Resources</strong></td>
</tr>
<tr>
<td>3,692,330,000 (3.69 million USD)</td>
<td>1,076,284,000 (1 million USD)</td>
</tr>
<tr>
<td><strong>The provincial autonomy</strong></td>
<td><strong>Student welfare</strong></td>
</tr>
<tr>
<td>200,000,000 (200,000 USD)</td>
<td>2,095,382,000 (2 million USD)</td>
</tr>
<tr>
<td><strong>Parents</strong></td>
<td><strong>Basic curriculum activity</strong></td>
</tr>
<tr>
<td>1,696,318,000 (1.69 million USD)</td>
<td>1,183,345,000 (1.1 million USD)</td>
</tr>
<tr>
<td><strong>Income from Administration</strong></td>
<td><strong>Selective curriculum activity</strong></td>
</tr>
<tr>
<td>118,000,000 (118,000 USD)</td>
<td>385,720,000 (385,720 USD)</td>
</tr>
<tr>
<td><strong>Assets</strong></td>
<td><strong>Support for educational activity</strong></td>
</tr>
<tr>
<td>15,000,000 (15,000 USD)</td>
<td>215,075,000 (215,075 USD)</td>
</tr>
<tr>
<td><strong>Carry over from the last year</strong></td>
<td><strong>Administration</strong></td>
</tr>
<tr>
<td>880,000,000 (880,000 USD)</td>
<td>1,627,042,000 (1.6 million USD)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>Financing activities</strong></td>
</tr>
<tr>
<td>6,602,848,000 (6.6 million USD)</td>
<td>20,000,000 (20,000 USD)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
</tr>
<tr>
<td>6,602,848,000 (6.6 million USD)</td>
<td>6,602,848,000 (6.6 million USD)</td>
</tr>
</tbody>
</table>

Source: Educational Plan of 2015, BMT

Facilities and Equipment

Tables 6 and 7 show BMT’s Facilities and equipment. As Table 6 shows, BMT retains a large campus compared to other TVET schools, and their laboratory occupies about 21,300 m², which is larger than regular classrooms’ total size. Regarding the school’s retention of equipment and materials for practical training, each department of the school shows some deficiency as to the required amount (total of 10% of deficiency). However, given the size of the school, the deficiency is relatively small compared to other TVET schools.
Table 6: School facilities (Total land 142,651 m²)

<table>
<thead>
<tr>
<th>Regular classroom</th>
<th>Laboratory arranged with the MoE</th>
<th>Laboratory</th>
<th>School administration</th>
<th>Library</th>
</tr>
</thead>
<tbody>
<tr>
<td>10,337</td>
<td>188</td>
<td>21,161</td>
<td>2,506</td>
<td>1,287</td>
</tr>
<tr>
<td>Gym</td>
<td>Dormitories</td>
<td>Welfare facilities (e.g. a school cafeteria)</td>
<td>School housing (12 households)</td>
<td>Other</td>
</tr>
<tr>
<td>2,358</td>
<td>7,259</td>
<td>2,882</td>
<td>697</td>
<td>4,252</td>
</tr>
</tbody>
</table>

(Source: 2015 Education Program, BMT)

Table 7: Retention of equipment and materials for practical training (Korean Won)

<table>
<thead>
<tr>
<th>Department</th>
<th>Requirement</th>
<th>Retention</th>
<th>Deficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Precision Machine</td>
<td>2,671,940</td>
<td>2,431,328</td>
<td>240,612</td>
</tr>
<tr>
<td>Mold Design</td>
<td>2,645,087</td>
<td>2,142,846</td>
<td>502,241</td>
</tr>
<tr>
<td>Shipbuilding and Machine</td>
<td>1,347,416</td>
<td>1,275,466</td>
<td>71,950</td>
</tr>
<tr>
<td>Robot Tech</td>
<td>3,972,125</td>
<td>3,629,415</td>
<td>342,710</td>
</tr>
<tr>
<td>Total</td>
<td>10,636,568</td>
<td>9,470,055</td>
<td>1,157,513</td>
</tr>
</tbody>
</table>

(Source: 2015 Education Program, BMT)

The fact that the school retains adequate financial resources is supported by the finding from the survey and interviews with the teachers and students.

During the survey with teachers, 91 teachers (85%) responded that school building conditions are either excellent or good (Graph 3), 90 teachers (84%) responded that equipment maintenance is either excellent or good (Graph 4), 88 teachers (83%) respond that retaining full or updated equipment is either excellent or good (Graph 5). Overall, the majority of teachers are satisfied with the school facilities and equipment and its maintenance. Furthermore, during the interview with teachers, they indicated that even though there is some deficiency in retention of equipment and materials for practical training, BMT possesses adequate financial resources compared to other TVET schools.
Graph 3: School building conditions, including the practical training facility


Graph 4: Equipment maintenance


Graph 5: Retaining full and updated equipment

During the survey conducted by the Bank, the majority of students showed their satisfaction in regard to the school’s facilities and equipment. 366 students (67%) responded that they are either very satisfied or satisfied with classroom conditions (Graph 6), 61% responded that they are either very satisfied or satisfied with computer labs and access (Graph 7), and 72% responded either very satisfied or satisfied with practical training resources (Graph 8).

**Graph 6: Classroom conditions**

![Graph 6: Classroom conditions]

*Source World Bank, 2015*

**Graph 7: Computer labs/Computer access**

![Graph 7: Computer labs/Computer access]

*Source World Bank, 2015*
Also, during the interview with ten students, they all agreed that the school retains adequate training facilities and equipment that enables each student to have enough practice.

Furthermore, in regard to the question of financial support, 85% of the students responded that at least some portion of course fees, residential costs, academic materials are covered by the school (Graph 9).

**Graph 8: Practical training resources**

![Graph showing training resources]

*Source World Bank, 2015*

**Graph 9: To what extent does a scholarship and/or any other financial support cover your course fees, residential costs, academic materials, etc.?**

![Graph showing financial support]

*Source World Bank, 2015*

**Human Resources**

**The Number of Teachers and Staff**

As one of largest Meister High Schools, BMT also retains a large number of teachers and staff. See Table 8 for details. Teachers include one principal, two vice-principals, and 113 teachers. 65 teachers are specialty teachers.
Table 8: The number of teachers and staff

<table>
<thead>
<tr>
<th>Teachers &amp; Staff</th>
<th>Principal</th>
<th>Vice Principal</th>
<th>Teacher (Common subject)</th>
<th>Teacher (Specialty subject)</th>
<th>Sub total</th>
<th>Chief Executive</th>
<th>School Staff</th>
<th>Sub Total</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>1</td>
<td>2</td>
<td>48</td>
<td>65</td>
<td>116</td>
<td>1</td>
<td>48</td>
<td>49</td>
<td>165</td>
</tr>
</tbody>
</table>

Source: [http://bmt.hs.kr/](http://bmt.hs.kr/)

The Characteristics of BMT Teachers

The majority of teachers of BMT are in their 50s, while there is a shortage of teachers in the 40s age-range. This shortage prevails in TVET schools in Korea, because during the 1990s, the government’s policy on TVET teachers limited the number of teachers. The average educational level of the teachers is an undergraduate degree, but there are a good number of teachers who have obtained a master’s degree in their areas of specialty.

Graph 10: Age distribution of teachers (total 116)

Source, The School Planning of 2015, BMT

Graph 11: Experience (total 116)

Source, The School Planning of 2015, BMT
In-service Training

In terms of in-service training, the school requires teachers to receive in-service training of 90 hours per year. According to their Educational Planning of 2015, among 65 specialty teachers, 4 from Precision Machining, 8 from Mold Design, 17 from Shipbuilding and Machining, and 15 from Robot Tech, received in-service training in their respective areas from various training institutes including Hangi Training Institute for Human Resource development; Korea University of Technology; Hyundai Heavy Industry Technology Training Institute; ProTech. Co. This is also evidenced by the teacher’s survey conducted by the Bank. The survey results show that 96% of the teachers received in-service training, and among them, 59% of teachers have received more than 61 hours until April, 2015 (Graph 13). Also, Graph 14 illustrates that the majority of teachers (61%) received the training in the form of a seminar/workshop.

Graph 12: Educational level of teachers (total 116)

Source, The School Planning of 2015, BMT

Graph 13: The number of hours per year did you complete in-service training

Source World Bank, 2015
We asked the teachers to assess their own competency during the survey. 98% of the teachers regard themselves as a competent teacher who possesses required technical and teaching skills. Also, the same number of teachers believes that the school has adequate teacher recruitment standards to select competent teachers.

During the in-depth interview, all teachers indicated that the most important element of being a competent TVET teacher is technical skill. However, newly hired teachers lack technical skills due to their lack of practical training during their teacher college programs. To overcome this issue, according to the Principal, the school offers a long-term training (three to six months) to newly hired teachers and hires a temporary teacher to substitute them during their absence. Also, the school appoints mentors from industry and teachers to them to improve their technical skills.

As for the experienced teachers, they are also required to take in-service training of 90 hours per year to update their technical skills, which is also reflected in the teacher’s assessment. They select in-service programs either offered by the Busan education office, universities (e.g. Korea University of Technology), or companies. For some specific skills, BMT develops its own training program with an approval from the Busan education office.

Second, the teachers pointed out the necessity of having a technical instructor who can demonstrate the running of a specific machine and equipment to the students and also continually maintain them. They stated that the regular teachers do not have time to master the utilization of and maintain all the machines and equipment, particularly new ones. To overcome this issue, the Principal mentioned that the school hired five part-time instructors who co-teach with the specialty teachers. However, because of a lack of sense of the responsibility of these instructors, some teachers recommended that the school should hire full-time technicians.

The students also agreed that their teachers are highly competent. According to the Bank survey, 415 students (75%) perceived that teachers are generally competent by responding that they are either very satisfied or satisfied with their teacher and instruction (Graph 15).
Also, according to an internal survey, the students indicated that their low understanding of the program is not due to inadequate teachers’ lecture methods (15.1%), but rather their lack of motivation to learn (49.7%) (Educational Planning of 2015, BMT).

**Graph 15: The students’ opinion on the teacher**

![Graph image]

*Source World Bank, 2015*

During the interview with the students, they further stated that the teachers are competent in both technical knowledge and teaching. For example, the teachers perfectly demonstrate and explain how to use a specific machine and provide one-on-one teaching to all students. Considering the teachers’ age, the students said the older teachers have more teaching and technical skills than the younger teachers, and these older teachers are able to teach the latest skills. Also, according to them, the teachers support the students in acquiring certificates by working closely with them even after class, weekend and vacation. The teachers actively find prospective companies for the students and continually provide the students with information on employment with these companies.

**Career Development Supporting Programs**

The school offers various programs to help the students build their career plans.

First, “Semester for Promotion of Learning Motivation” is one of new initiatives that have been developed by the current Principal, Dr. Lee. The program is offered to freshmen during the first month of the high school year. The purpose of the program is to improve the students’ learning motivation and help them develop their career plans. Also, the school expects to see the enhancement of the students’ sense of community, self-reflection, self-esteem, self-control, filial devotion, and respect. During this month, the students participate in various group activities and attend special lectures conducted by prominent graduates. They also visit large companies (Hyundai Motor, Hyundai Heavy Industry, Posco) for one day as well as SMEs of their related companies for two days. Also, during this period, the students should develop their career load map and “My Portfolio” which is used for the rest of the high school year.

According to the internal survey, 59.5% teachers responded either very satisfied or satisfied (very satisfied, 16.5%; satisfied, 43%); 63.5% of parents responded either very satisfied or
satisfied (very satisfied, 26.3%; satisfied, 37.2%); and 63% of students responded either very satisfied or satisfied (very satisfied, 30.1%; satisfied, 32.9%). Overall, the teachers, parents, and students are satisfied with this program (The Educational Planning of 2015, BMT).

During the interview conducted by the Bank, several teachers and students referred to this program (Semester for Promotion of Learning Motivation) as one of the most successful BMT programs that assist students in building their future career plans. During the interview, the students stated that this program motivates them to study hard and develop their career plans. They said that “My future company visit” during the Motivation program was a key in helping them understand how a manufacturing plant operates and the workings of a real job.

Second, another program is “Weekly Special Lectures of Personalities” held on the 4th Friday of each month which includes invites of prominent alumni, such as corporate CEO. The goal is to foster the students’ motivation for future achievement and a job acquisition. In addition, the lecture is expected to increase the students’ self-confidence, cultivate a caring mind for others, and develop their future career plans.

According to the internal survey, 69.7% of teachers responded either very satisfied or satisfied (very satisfied, 22.8%; satisfied, 46.9%); 57.3% of parents responded either very satisfied or satisfied (very satisfied, 26.3%; satisfied, 31%); and 51.9% of students responded either very satisfied or satisfied (very satisfied, 23%; satisfied, 28.9%). Overall, the teachers, parents, and students are satisfied with this program (The Educational Planning of 2015, BMT).

The fact that BMT instituted the excellent support system to enhance employment is supported by evidence collected by the Bank. During the survey with the teachers, 38% of teachers rated the school’s supporting system excellent, particularly in the area of career service (Graph 16). Also, during the interview, they agreed that the school has successfully motivated the students to learn and helped them develop the career plans. In addition, the school helps the students understand their future job in the real production field. Furthermore, according to the Principal, this supporting system directly influenced the employment rate. As of April, 90 students out of 295 (3rd grade) secured their employment, and in order to make this happen, the school has provided various other programs, besides the two aforementioned programs, such as employment camp, Job Fair, and Field visits to companies. The career development department helps the students prepare for their self-introduction letter and interview.

Graph 16: The teachers’ perception on the school’s existing support system (e.g. career service)
The students also said that the school’s supporting system has been very helpful. During the survey, 63% of the students have received career counselling, and among them, 89% responded that the counselling has been helping them navigate their career plans. During the interview, the students mentioned that the school helps them: (1) develop the career plan via the above programs (Semester for Promotion of Learning Motivation, Weekly Special Lectures of Personalities, and career counselling services); (2) find a company; and (3) prepare them for acquiring a position with that company. The school helps them concrete their career plans: for example, the homeroom teacher, particularly, guides them in finding their interest, specific occupation and companies. Then, the school provides information on the company and special employment opportunity: for example, assisting the students in acquiring certifications needed for the specific job and company, improving their interview skills, and supporting them in writing resume and self-introduction letter. Also, the students pointed out other supporting system, such as an aptitude test that is held twice a year, One-on-One Meeting with the homeroom teacher and staff of career development department, field trip to companies, and employment camp, is helpful.

**Factor 2: Relevant Program**

The program of the 1\(^{st}\) year focuses on the National Common Basic Curriculum, while the program of the 2\(^{nd}\) and 3\(^{rd}\) year focuses on Optional Subject Curriculum. The BMT offers a total of 210 credits during the three year, and the ratio among normal subject vs. specialist subject vs. creative subject is 38.1: 50.4: 11.4. As BMT is a specialized high school whose specific purpose is to produce skilled workers within relevant fields, the specialist subjects occupy the most (50%), and they are mostly required credits (Table 9).

**Table 9: Curriculum and Credits**

<table>
<thead>
<tr>
<th></th>
<th>Normal subject</th>
<th>Specialist subject</th>
<th>Creative subject</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Required credits</strong></td>
<td>42</td>
<td>78</td>
<td>24</td>
<td>144</td>
</tr>
<tr>
<td><strong>Selective credits</strong></td>
<td>38</td>
<td>28</td>
<td></td>
<td>66</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>80</td>
<td>106</td>
<td>24</td>
<td>210</td>
</tr>
<tr>
<td><strong>%</strong></td>
<td>38.2%</td>
<td>50.4%</td>
<td>11.4%</td>
<td>100%</td>
</tr>
</tbody>
</table>
Technical Skills

In addition to the regular curriculum, the students can improve their technical skills by joining a student club. For example, the students can join the club of a technical training program, such as CNC milling, CNC lathe, Mold design, Machine design, Polymechanics, Refrigerating technology, Piping, Welding, ad Mechatronics. Also, they can join technology research, such as Making Robot, FA, Practical Use of Invent, Electric CAD, Steel Frame Structure, Model Plane, Patent for an Invention, Mobile, and Indoor Controlling. The school also offers ten skill clubs to the select students to prepare them for various skill competition awards in their relevant areas as well as increase their talents and employment opportunity. Each club is managed by one designated teacher who works closely with these select students.

According to the internal survey, 64.7% of the students responded that they are either very satisfied or satisfied (very satisfied, 26.8%; satisfied, 37.9%) with their club activity (The Educational Planning of 2015, BMT).

Creativity and Problem Solving Skills

To meet industrial demands, BMT also focuses on improving the students’ creativity and problem-solving skills. The school created “Creative Design Center”, “Realization of Think different, Seek teamwork, Make operate, Challenge yourself (T.S.M.C)”,”the Project-based Education Program”, Unlimited Imagination Lounge”, and “Mathematics and Science Lounge”.

Regarding “the Project-based Education Program”, the program encourages the students to incubate their ideas via free and open debates, choose their own topic, and work as a group. Also, see Diagram 4. “Unlimited Imagination Lounge” fosters leadership and entrepreneurship by providing basic technical skills and opening this specific facility for 24 hours to students. “Mathematics and Science Lounge” cultivates the students’ basic math ability for engineering. The program is delivered in the form of one-point lessons for students who require additional assistance and in the form of level-differentiated small group classes.

According to the internal survey, 49.4 of teachers responded either very satisfied or satisfied (very satisfied, 8.9%; satisfied, 40.5%); 60.7% of parents responded either very satisfied or satisfied (very satisfied, 25%; satisfied, 35.7%); and 69.8% of students responded either very satisfied or satisfied (very satisfied, 21%; satisfied, 48.8%) with “Creative Design Center” (The School Planning of 2015).

Education of Humanity

The goals of the program are to build sound relationships with others; maintain a harmonious environment on campus through Morning Greetings among students, teachers, and parents; enhance filial devotion and sound family culture through Father and Sons Camps; increase a sense of community; and cultivate a good lifestyle using polite words.
According to the internal survey, 58.2% of teachers responded either very satisfied or satisfied (very satisfied, 11.4%; satisfied, 46.8%); 57.3% of parents responded either very satisfied or satisfied (very satisfied, 25.5%; satisfied, 31.8%); and 60.7% of students responded either very satisfied or satisfied (very satisfied, 27.5%; satisfied, 33.2%) with “the Reinforcement of Character Education” (The Educational Planning of 2015).

Basic Skills

In order to strengthen the students’ basic skills, BMT offers after class programs. The programs include the preparation for certificates, foreign language, mathematics/science skills, and basic knowledge of another three majors. The topics of after class are selected by the students, and they must attend at least one of the classes. Instructors are invited from either inside or outside BMT. Each class is continually assessed by regular monitoring and feedback.

Entering College with Advance Points

Even though they are in a TVET track, more than half of the students are interested in pursuing further education after employment as evidenced by the survey conducted by the Bank. 56% of the students responded that upon graduation, they pursue an advanced degree. To meet this demand, the school also offers the special program, “Entering a College with Advance Points”. The students gain employment first and enter college later with advanced points that they obtained during the high school year. For this, the school developed a MoU with companies and college to combine work with learning.

According to the internal survey, 20.2% of teachers responded either very satisfied or satisfied (very satisfied, 3.8%; satisfied, 16.4%); 43.7% of parents responded either very satisfied or satisfied (very satisfied, 18.2%; satisfied, 25.5%); and 38.5% of students responded either very satisfied or satisfied (very satisfied, 18.2%; satisfied, 20.3%). Overall, the teachers, parents, and students are satisfied with this program (The Educational Planning of 2015).

The findings support the fact that BMT is providing the students with the programs that enhance the skills required by industry. First, for the question of the relevance of the school curriculum (Graph 17), 87% of the teachers said either agree or strongly agree, and 93% of the teachers said the school offers high quality programs (Graph 18). 60% of the teachers said that the students still need to take additional training to be employed (Graph 19). This is because in Korea’s case, the students need to acquire certificates, and additional training serves this purpose. Overall, 95% of the teachers believe that the school provides relevant teaching programs (including practical training) to produce competitive school outcomes. Furthermore, 90% of the teachers believe that the program also can help students advance to higher education.

**Graph 17: The school curriculum (both academic and practical) reflects current industry demands**
Graph 18: The school offers high quality programs


Graph 19: My students need to take additional outside training to be employed

During the in-depth interview, the teachers generally agreed that the school offers the program that is needed by industry. According to the Principal, the currently needed skills include basic technical skills, cognitive skills, problem-solving skills, self-determining, and humanity of ethic, patience, diligence, adaptation, and consideration. To improve problem-solving and creativity, the school has developed several new initiatives.

Regarding technical skills, the teachers believe that the school should impart basic technical skills because this skill is the job-ready skills needed in the production line and a basis for acquiring firm-specific skills. According to these teachers, because in reality it is impossible for the school to teach specific skills, the school should focus on teaching the basic technical skills that can be a basis for the specific skills once they are hired by a specific company.

Also, to meet the rapid changes in industry, BMT annually review its curriculum and update supplement training materials. Textbooks are developed by the MoE in collaboration with industry as the goal of Meister high school is to match manpower with industrial demands. On the other hand, each major develops its own supplement training materials in collaboration with about four companies in their relevant fields.

The students also support the fact that BMT provides the relevant program to its students.

During the internal survey, the students indicates their satisfaction with the school program by stating that the reason for their low understanding of the program is not because of inadequate curriculum but because of their lack of learning motivation and absence of goal (49.7%). Also 63.7% of the students responded that they are either very satisfied or satisfied (very satisfied, 25.6%; satisfied, 38.1%) with their major (The Educational Planning of 2015).

During the survey conducted by the Bank, 56% of the students responded that they receive more than 20 hours of practical training at school per week (Graph 20). For the question of whether they believe the school is preparing them adequately, skill-wise, to find a job, 72% of the students responded “Yes”. 78% of the students said that they take additional training aside from school’s regular program, and among them, the more than half is receiving
training between 10 and 15 hours per week (Graph 21). 59% of the students also said they are planning to receive additional training from a training institute after graduation.

**Graph 20: The number of hours per week for practical training at school**

![Graph 20: The number of hours per week for practical training at school](image)

*Source World Bank, 2015*

**Graph 21: The number of hours per week for additional training**

![Graph 21: The number of hours per week for additional training](image)

*Source World Bank, 2015*

During the interview, the students all agreed that the school offers the relevant programs. Also, the students said that they take additional training aside from school’s regular program
not because they lack practical training but because they need to prepare for certain certificates. The school provides additional training courses after class, during weekend and vacation in order to help them obtain certificates, which increases the chance of being employed. In Korea’s case, the students said that during a hiring process, companies give an emphasis on whether or not an applicant holds needed certifications.

**Factor 3: Effective Management System**

BMT’s unique feature of management is “Center-focused Department Management” which aims to improve open communication, unity, and harmony among the faculty members by integrating 25 departments into seven major centers. The seven centers are the Education Planning Research Center; Meister Center; Technical Education Center; Creative Design Center; Cognitive Education Center; Student Support Center, and the School Administration Support Center. The school holds the bi-weekly meetings to discuss and share the center’s issues, including curriculum, budget, and facilities; therefore, during the meetings, the teachers understand the total workflow across the department as well as the centers. Also, the center-focused management enables the school to use the budget efficiently as the funds are allocated to each center, and the departments within the center share the funds overall.

**Organization of School Management**

BMT’s organizational chart is illustrated below (Diagram 6). The management includes one principal, two vice principals, seven center heads and 25 team leaders. Under the Principal, there are two vice-principals and one head of Administration. Each vice principal is responsible for the three centers, and each head of center manages their own department. The head of Administration under the Principal manages the school administration center that consists of five departments, including school-industry cooperation.

**Diagram 6: The School Organization**
The Roles and Responsibilities of Seven Centers

**Education Planning Research Center** includes two departments, Department of School Administration and Department of Education Research. The former’s responsibilities include managing “Semester for Promotion of Learning Motivation”, “Practical Project”, and admission. The latter’s responsibilities include supporting the development of textbooks and teachers’ practical training.

**Meister Center** includes five departments, Department of Meister, Department of Employment, Department of 1st grade, Department of 2nd grade, and Department of 3rd grade. The responsibilities of each department include:

- Department of Meister: cooperating with other Meister High Schools in program development, student employment, monitoring of Meister High School; managing school industry cooperation
- Department of Employment: supporting student employment; supporting in-company practical training; managing information on companies; developing strategies for improving employment rate via “School-Industry Cooperation Advisory Committee”
- Department of 1st grade: managing “Semester for Promotion of Learning Motivation”; managing “Weekly Special Lectures of Personalities”; providing career counsel, including helping students prepare a personal portfolio
- Department of 2nd grade: providing career counsel; helping students prepare for in-company practical training
- Department of 3rd grade: providing career counsel; managing students’ in-company practical training
Technical Education Center is composed of four specialty subject programs, focusing on increasing students’ competency in their designated field, assisting them in obtaining certifications, securing equipment and materials, and updating/developing text books.

Creative Design Center is responsible for managing the Department of Creative Skills, After Class School, and Mathematic Education. The Department of Creative Skills’ tasks include improving students’ problem-solving skills and developing College with Advance Points. After Class School department’s tasks include supporting “Student Clubs” and assisting students in obtaining certificates. The Mathematic Education Department’s tasks include improving students’ numerical and science knowledge.

Cognitive Education Center focuses on improving students’ foreign language skills and physical activities.

Student Support Center focuses on the students’ welfare, including dormitory and foods.

School Administration Support Center includes five departments, and the Department of School-Industry Cooperation is one of them. The main responsibilities of the Department of School-Industry Cooperation include developing a MoU with companies and government agencies, supporting student in finding employment, and managing the “School-Industry Cooperation Advisory Committee”.

The school conducted the survey with the teachers to assess its management. First, regarding the question of to what extent teachers’ suggestions and demands are reflected in the school’s education plan and aim, 36.7% of the teachers responded “some” and 44.3% responded “moderate”. In regard to the question of to what extent teachers’ suggestions and demands are reflected in the school’s division of duties and personnel management, 40.5% of the teachers responded “some” and 35.4% responded “moderate”. Third, regarding the school’s support for in-service training, 17.7% of the teachers responded “very satisfied” and that 46.8% said “satisfied”. Another question concerned whether they were satisfied with BMT’s educational goal suggested in 2014, 62% responded “satisfied”. Lastly, 35.4% of the teachers said they are “satisfied” with the center-focused management (The Educational Planning of 2015, BMT). Overall, the teachers are satisfied with the management system.

The Bank also conducted the survey with the teachers in regard to their perception of the school management, particularly leadership. 91% (35% very satisfied; 56% satisfied) of the teachers believe that the school leaders have consistent school policies. 91% (35% very satisfied; 56% satisfied) of the teachers believe that the school leaders execute the school’s guiding principles with clarity (Graph 22). 92% (37% very satisfied; 55% satisfied) of the teachers believe that the school leaders envisage the future and consistently look for new and innovative products, processes, and services (Graph 23). 74% of the teachers (23% strongly agree; 51% agree) responded that the school leaders encourage collaboration by building trust among faculty members (Graph 24). 74% of the teachers (24% strongly agree; 50% agree) responded that the school leaders encourage self-determination and the developing competence of teachers (Graph 25). 82% of the teachers (32% strongly agree; 50% agree) responded that the school has a shared vision among their faculty and staff (Graph 26). 76.4% of the teachers (25.5% strongly agree; 50.9% agree) said that the school leaders are consistent about their words and deeds. 87.7% of the teachers (31.1% strongly agree; 56.6%
agree) said that the school leaders recognize my contribution by showing appreciation. Lastly, 82% of the teachers (27% strongly agree; 55% agree) responded that the school has the capacity to deal with both anticipated and unexpected challenges/risks (Graph 27).

Graph 22: My school leaders execute the school’s guiding principles with clarity

Source World Bank, 2015

Graph 23: My school leaders envisage the future and consistently look for new and innovative products, processes, and services.

Source World Bank, 2015
Graph 24: My school leaders encourage collaboration by building trust among faculty members

Source World Bank, 2015

Graph 25: My school leaders encourage self-determination and the developing competence of teachers

Source World Bank, 2015

Graph 26: The school has a shared vision among their faculty and staff

Source World Bank, 2015
During the interview, two issues emerged: the teachers’ lack of sense of ownership and a lack of communication between the management and the faculty members as well as among the faculty members. In regard to the sense of ownership, the teachers stated that the issue arises due to Korea’s teacher recruitment system. In Korea, each provincial education office retains the pool of certificate teachers and appoints them to the schools located within the province. So, teachers are employed by a local education office, not by the school, and they stay in each school for a limited number of years (up to five years). As a result, teachers in general feel less responsible for and ownership of their appointed schools. This also occurs with BMT. Also, considering the large number of faculty members compared to other TVET schools, BMT faces difficulty in increasing communications between the management and the faculty members as well as among the faculty members.

To overcome this issue, the Principal reorganized the school from 25 departments to the seven centers, hoping to see an increase in information flow and a developed sense of ownership among the teachers. Several departments are concentrated under one center, and each department must take responsibility for their own department’s affairs as well as share their information and resources with other departments within the center. The seven centers will then share their information and resources with the other six centers and the head of each center will directly communicate with the Principal. In this way, all faculty members will then be responsible for their own department and center and able to communicate with other departments.

Second, the teachers stated that the resources are efficiently utilized in this center-focused management. For example, financial resources are allocated to the seven major centers, and within the center, the funds flow across the departments. The departments within the center are encouraged to share information, budget, and machines and equipment to increase efficiency of utilization of the resources. For example, unlike other TVET schools, the four departments of BMT (four majors) share their machines and equipment with another department.
Third, the teachers all agreed that management contributes to the school outcome. The teachers first indicated the Korean education system as an example. The Korean education system confers the strong management power to the Principal. For example, the Principals can reorganize the school system, manage teachers, and even develop new curricula. This is so, because especially Meister High Schools have more freedom to develop their own curricula to meet industry demands; therefore, the Principal of BMT is able to develop and institute his new initiatives. In addition to this power conferred by the government, BMT Principal has strong vision: He defined new skills required by the labour market as creativity, self-directing skills, problem solving skills, and accordingly developed new programs to meet this demands. Several teachers referred to the school’s new initiative programs as one example of the principal’s strong leadership, because these programs were initiated and developed by the principal whose vision is to provide the students with an opportunity to acquire industrial demanded skills and develop their career roadmaps.

However, few teachers mentioned that this vision should be shared more by the rest of the teachers. His messages should convince more teachers who believe that the school should focus more on the basic technical skills than creativity as the students of secondary level TVET has a limited role in the labour market. Also, the Principal needs to have more communication with the teachers and involve more teachers in the decision-making process. However, even these teachers said there is no doubt about the Principal’s strong vision and leadership, and this has contributed to the school outcomes.

Lastly, one teacher pointed out that management impacts the employment rate by increasing the students’ motivation and confidence. The experiences during the new initiative programs, such as “Semester for Promotion of Learning Motivation”, directly influence the students in improving their motivation on learning and acquiring a job. This view is supported by the students as well. During the interview, the students stated that their experiences during “Semester for Promotion of Learning Motivation” helped them find the purpose of their study and navigate a career plan, which pushed them to work harder during the school year to achieve the goal of employment with prospective companies.

**Factor 4: School Industry Linkages**

To strengthen school-industry linkages, BMT has created various departments, including School Industry Cooperation TF, the School-Industry Cooperation Advisory Committee, Council for Operation Field Practice, and Management of Job Career Development Center. Furthermore, the school organizes several field visits to select companies for the students.

**School-Industry Cooperation Advisory Committee**

The committee is composed of the school teachers/staff and representatives from enterprises. The chair is selected from industry, and the head of the Meister Center is designated as an assistant administrator. Within the committee, operation committee members are composed of the vice principal, the head of five centers, and the team leader of the 3rd grade, two staff members from the school-industry cooperation department, and the head of four major departments; while advisory Committee members are composed of representatives from enterprises. The meeting is held annually, and during the meeting, the members discuss specific programs, textbooks, and curriculum to meet industrial demands, share employment
information, and discuss the possibility of in-company training for both the students and teachers.

Council for Operation and Field Practice

The council is composed of the vice principal, the head of five centers, and the team leader of 3rd grade, the head of four major departments. The vice principal is designated as a head and the head of the Meister Center is designated as an assistant administrator. Their main tasks include selecting companies for practical training; defining procedure for in-company practical training; and assessing practical training.

School Industry Cooperation TF

Its role is to develop a MoU with prospective companies, and their specific activities include finding excellent SMEs, visiting these SMEs, developing a MoU with them, and sending students to these companies for in-company practical training and employment. Table 10 shows the number of new companies in which the school developed a MoU between 2011 and 2014, and the school also aims to develop a MoU with 60 companies in 2015.

Table 10: The number of companies that has a MoU with BMT

<table>
<thead>
<tr>
<th>Year</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015 (Planning)</th>
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<tbody>
<tr>
<td></td>
<td>63</td>
<td>34</td>
<td>39</td>
<td>51</td>
<td>60</td>
</tr>
</tbody>
</table>

Source, 2015 School Program, BMT

Job Career Development Center

The center’s main responsibilities include building database on company information in connection with SMEs administration; supporting educational programs offered by the companies; organizing staff’s company visits to develop a MoU for the employment. In addition, the center provides the students with the latest information on the companies, helping them prepare self-introductions resumes, and job application letters, and providing personalized career counselling via job interview simulation. According to the internal survey, 65.9% (very satisfied, 16.5%, satisfied, 49.4%), 55.9% of parents (very satisfied, 22.4%; satisfied, 33.5%), and 62% (very satisfied, 24.6%; satisfied, 37.4%) of the students said that they are either very satisfied or satisfied with their experience with the Job Career Development Center (The Educational Planning of 2015, BMT).

Field Trip to Select Companies

The school provides students with an opportunity to visit prominent companies to help them understand how products are manufactured in the production lines, to help them develop their career roadmaps, and to promote school-industry linkages. Table 11 shows the name of the company and the number of students of each major who visited these companies. Because the students of 3rd year are taking in-company training during summer, the site visit is designed specifically for 1st and 2nd grade students who are still developing their career plans.
Table 11: Field Trip

<table>
<thead>
<tr>
<th>Department</th>
<th>The name of the company</th>
<th>Grade</th>
<th>The number of Students</th>
</tr>
</thead>
<tbody>
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<td>Keif</td>
<td>1&lt;sup&gt;st&lt;/sup&gt; and 2&lt;sup&gt;nd&lt;/sup&gt; grade</td>
<td>895</td>
</tr>
<tr>
<td>Precision Machine</td>
<td>Yulgok</td>
<td>1&lt;sup&gt;st&lt;/sup&gt; and 2&lt;sup&gt;nd&lt;/sup&gt; grade</td>
<td>180</td>
</tr>
<tr>
<td>Mold Design</td>
<td>Sinhan</td>
<td>1&lt;sup&gt;st&lt;/sup&gt; and 2&lt;sup&gt;nd&lt;/sup&gt; grade</td>
<td>229</td>
</tr>
<tr>
<td>Shipbuilding and Machine</td>
<td>Samsung Heavy Industry</td>
<td>1&lt;sup&gt;st&lt;/sup&gt; grade</td>
<td>60</td>
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<td>Korea Aerospace Industries</td>
<td>2&lt;sup&gt;nd&lt;/sup&gt; grade</td>
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<tr>
<td>Robot Tech</td>
<td>Samsung Heavy Industry</td>
<td>1&lt;sup&gt;st&lt;/sup&gt; and 2&lt;sup&gt;nd&lt;/sup&gt; grade</td>
<td>220</td>
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<tr>
<td></td>
<td>Busan Transportation Corporation</td>
<td>1&lt;sup&gt;st&lt;/sup&gt; and 2&lt;sup&gt;nd&lt;/sup&gt; grade</td>
<td>220</td>
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During the survey conducted by the Bank, 95% of the teachers believe that their school has built a successful partnership with companies in order to enhance school outcomes. Also, in regard to the type of cooperation, 96% of the teachers believe that a school should have a formal partnership with companies. Although it is important to develop the formal school-industry linkage, the teachers often face difficulty because of a lack of the company’s interest. 67% of the teachers said the main reason for preventing the school from developing a formal partnership is the companies’ disinterest (Graph 25).

Graph 25: If your school does not have a formal partnership, what barriers will the school encounter in forming the partnership

During the interview, all teachers stated that SMEs are generally not interested in developing school-company cooperation. According to them, SMEs are not much interested in offering pre-employment training to students because they do not retain adequate training places and instructors. Also, their production lines are too busy to meet their own production deadlines. However, the companies train newly hired staff for job specific skills; therefore, most SMEs train the students who are of premise employment with them.
To overcome this challenge, BMT teachers have made tremendous efforts by visiting companies in personal to discuss a possible collaboration and have developed a MoU. Once a MoU is developed, then the companies participate in developing training materials and curriculum as well as provide scholarship, in-company training for the students and teachers, places for the field visits and employment.

Also, all teachers agreed that their cooperation with the companies is systematic as the MoU defines each other’s roles and responsibilities. The role of companies is rather advisory: for example, during the School-Industry Cooperation Advisory Committee meeting, the representatives from the companies provide advice on the direction of the program and curriculum. In regard to developing BMT’s own training materials, the teachers of each department work closely with the representatives from four companies according to their relevant fields.

However, most teachers indicated that the companies need to be more active in this cooperation. Although the formal School-industry Cooperation Advisory Committee is held twice a year, sometimes one and third representatives of the companies fail to attend the meeting. Therefore, the teachers said that the school-industry cooperation can have the best outcome only when the companies also actively participate in this cooperation.

**Conclusion**

This paper reversely examined the relationship between outcomes and premise factors by selecting a high-performance school (the high graduate employment rate) and the impact of the premise factors on school outcomes. The logic is that if this high-performance school demonstrates that it possesses these factors and has close relationships with the outcomes, then we can conclude that these premise factors are likely to raise employment rates.

The first research question is whether or not the school possesses these factors. The findings strongly support that BMT has adequate resources, relevant programs, excellent management, and well-established school-industry linkages. The second question is whether or not the above premise factors impact school outcomes. The findings suggest that these factors both directly and indirectly influenced the BMT’s graduate employment rate. According to the survey and interview conducted with both the teachers and students, these factors increase the students’ employability, which leads to a higher chance of being employed, particularly with prospective companies. The third question concerns which of these factors determines what contributes most to the enhancement of school performance, in what context, and how this factor can be strengthened. According to the findings, the primary factor has changed throughout the time due to economic and social conditions.

During the 1970s, because the country shifted from a lighter to heavier manufacturing industry, it required different types of labor force, such as skilled technicians and experts. Accordingly, the government expanded technical and vocational education to meet the demand for skilled workers in the heavier manufacturing industry (Zang, 2009; Kim, 2000; Lee et al, 2012). Given this economic context, BMT was strongly supported by the government. In fact, the government founded BMT in 1967 to meet this shortage of skilled workers with support from the German government as well as IBRD. Then, the government produced practical trainers within a short time period by issuing a practical trainer certificate.
to those who graduated from BMT. The teachers stated that during this period, both financial and human resources are the most important factors contributing to the school’s performance. Although BMT faced a lack of resources, strong government support, support from IBRD and other donor countries, and the way of their ability to expedite technical teachers enabled them to overcome the odds.

Since 1985, the enrolment of higher education (both 2 year technical and vocational college and 4-year university) has rapidly increased due to economic growth and social demands. As a consequence, according to the teachers, all TVET schools had the most difficult time during 1990s: most students entered academic high school to pursue their higher education, while stigma attached to those who studied at TVET schools prevailed. During this time period, the teachers generally agreed that management, particularly a strong leadership and vision, was the most important factor that contributed to school outcomes. First, the management of BMT efficiently utilized its resources in the face of a lack of financial support from the government. Second, the management focused on establishing the school-industry cooperation with a strong support from its alumni. Because of its long history, BMT had a good number of prominent alumni, such as CEO of SMEs. Their companies provided employment, lecture, and scholarship to BMT students. Also, under the direction of the strong leadership, the teachers not only taught but also actively worked on establishing the school-industry cooperation. Therefore, the teachers said that during the 1990s when there was low demand for and high stigma attached to TVET schools, the management was the most important factor, and their recommendation was to have a leader with strong vision and leadership.

In 2008, the government made a major policy change in the TVET system. Due to a shortage of technical skilled workers and stigma attached to TVET schools, the government decided to establish Meister High School by selecting 39 existing TVET schools whose performance meet the criteria. The purpose of establishing the Meister High School is to produce skilled workers via a curriculum tailored to industry needs in order to reduce skills mismatching. Also, by transforming TVET schools into this specialized high school purposed to produce the best skilled workers, the Meister High School could reduce the stigma attached to TVET schools. To achieve this goal, first, the government provides the schools with financial resources to substitute their students’ tuition, dormitory, and fees, as well as to maintain training facilities and equipment. Second, the schools can have autonomy for developing customized curricula to meet the demands of companies in their relevant fields. Third, due to increasing school autonomy, the government encourages the schools to select a Principal with strong management skills via public contest. Lastly, the government encourages Meister from industry to train Meister High School students via the school-industry cooperation. In 2008, BMT became a Meister High School, and since then, it has received strong government support, particularly financial resources. Currently, BMT regained its reputation and high employment rate outcomes. And given the fact that a Meister High School has strong autonomy in the areas of curriculum development and management as well as its Principal’s strong autonomy, most teachers agreed that the management, particularly leadership, is a key factor determining the school outcomes. They recommended that the school should have a good leader who has vision, manage the resources efficiently, encourage the teachers to improve their competency, develop demand-driven, tailored school curriculum, and establish meaningful school-industry cooperation. This is because all school inputs are created and utilized under the direction of the school leader and his strong leadership.
Annex 1: Questionnaire for Teachers

Resources
1. Do you think the school provides adequate financial support to your students?
   1) Yes => go to Q1.1
   2) No
      1.1 Do you think providing financial support plays a primary role in attracting talented students?
         1) Yes
         2) No

2. Please respond to the following phrases utilizing a response from the ratings below. Select the rating that most clearly and honestly reflects your opinion:
   a. School building conditions, including the practical training facility
   b. Equipment maintenance
   c. Retaining full and updated equipment

<table>
<thead>
<tr>
<th>Excellent</th>
<th>Good</th>
<th>Fair</th>
<th>Bad</th>
<th>Poor</th>
</tr>
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</table>

3. Does the school have a support system to assist students with their career plans (e.g. a job service center)?
   1) Yes => go to Q3.1
   2) No

   3.1. Please rate the existing support system:

<table>
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<tr>
<th>Excellent</th>
<th>Good</th>
<th>Fair</th>
<th>Bad</th>
<th>Poor</th>
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</table>

4. Do you assist students in career development?
   1) Yes
   2) No

5. In your opinion, which is the most important criterion in recruitment of a competent teacher?
   1) Minimum academic qualifications (certificates, diplomas, and degrees)
   2) Minimum years of industry or work experience
   3) Minimum years of teaching experience
   4) Other

6. Do you think that your school’s recruitment standards for teachers are adequate enough to select competent teachers who will improve the employability of the student population?
   1) Yes
   2) No => go to Q6.1

   6.1 Please explain why the standards are not adequate ______________________

7. Did you complete in-service training?
   1) Yes => go to Q7.1-7.3
2) No

7.1. Select type(s) of training.
   1) Seminars, workshops, and conferences
   2) Formal courses
   3) Formal mentoring and leadership coaching
   4) Other

7.2. How many hours per year did you complete?
   1) Less than 10
   2) 10 -15
   3) 16 - 20
   4) More than 20

7.3. Did you receive the training from companies contracted by the school?
   1) Yes
   2) No

8. Are you a competent teacher; do you possess the required teaching skills set?
   1) Yes
   2) No => go to Q.8.1

8.1. What missing skills would increase your competence?
   1) More academic knowledge
   2) More practical training
   3) More work experience
   4) More teaching experience
   5) Other

9. Please rate your relationship with your students:

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<tr>
<th>Excellent</th>
<th>Good</th>
<th>Fair</th>
<th>Bad</th>
<th>Poor</th>
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</thead>
</table>

10. All in all, does the school have adequate financial and human resources to produce competitive school outcomes (e.g. the graduate employment rate)?
   1) Yes
   2) No

Teaching

11. Please respond to the following statements utilizing a response from the ratings below. Select the rating that most clearly and honestly reflects your opinion:

   a. The school curriculum (both academic and practical) reflects current industry demands.
   b. The school offers high quality programs (both academic and practical programs).
   c. My students need to take additional outside training to be employed.
   d. My students enjoy their studies.
   e. My students are highly competent.
12. Does the school offer academic programs to students who want to continue their education/pursue an advance degree?
   1) Yes => go to Q12.1
   2) No
12.1. Do you think this program helps students advance to higher education?
   1) Yes
   2) No

13. All in all, does the school provide relevant teaching programs (including practical training) to produce competitive school outcomes (e.g. the graduate employment rate)?
   1) Yes
   2) No

Management

14. Please respond to the following statements utilizing a response from the ratings below. Select the rating that most clearly and honestly reflects your opinion:

   a. My school leaders have consistent school policies.
   b. My school leaders execute the school’s guiding principles with clarity.
   c. My school leaders are consistent about their words and deeds.
   d. My school leaders envisage the future and consistently look for new and innovative products, processes, and services.
   e. My school leaders encourage collaboration by building trust among faculty members.
   f. My school leaders encourage self-determination and the developing competence of teachers.
   g. My school leaders recognize my contribution by showing appreciation.
   h. The school has a shared vision among their faculty and staff.
   i. The school has the capacity to deal with both anticipated and unexpected challenges/risks.
   j. The school is attracting highly competent students.

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<th>Strongly agree</th>
<th>Agree</th>
<th>Neither agree nor disagree</th>
<th>Disagree</th>
<th>Strongly disagree</th>
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15. Please rate the relationship
   a. between you and the principal
   b. between you and other teachers

| Excellent | Good | Fair | Bad | Poor |
Enterprise Linkages

16. Do you believe that a school should build a formal partnership with companies?
   1) Yes => go to Q16.1
   2) No

16.1. Please explain why _______________________

17. If your school does not have a formal partnership, what barriers will the school encounter in forming the partnership?
   1) The school is not interested in a formal linkage.
   2) The school desires a linkage but lacks the capacity.
   3) The companies are not interested.
   4) Other

18. Do you believe that your school has built a successful partnership with companies in order to enhance school outcomes e.g. graduate employment rate?
   1) Yes
   2) No

The Impact of Government Policy

19. To what degree has the government’s TVET policies impacted your school’s governance and policies?
   1) All
   2) Most
   3) Some
   4) None

20. Do you think Leadership at the National Level has consistent policies?
   1) Yes
   2) No

21. Do you think the government adequately articulates the policy on TVET collaboration (e.g. collaboration type, building methods, students’ rights) and develops laws for this?
   1) Yes
   2) No

22. Do you think the current Quality Assurance Framework (e.g. Standards, NQF) enhances school performance?
   1) Yes
   2) No

23. Do you think government financial mechanisms (e.g. incentives, vouchers) help enhance school performance?
   1) Yes
   2) No
24. Practically speaking, are your students readily able to advance their education e.g. from a community college to a four-year university or a technical/vocational high school to college?
   1) Yes
   2) No
Annex 2: Questionnaire for Students

1. Why did you select the technical or vocational track?
   1) Lack of financial support from parents
   2) Low school achievement (test scores, GPA)
   3) Preference to be employed after secondary graduation
   4) Parents’ advice
   5) Teacher’s advice
   6) Other

2. Why did you select this particular school?
   1) My test scores and GPA
   2) Personal interest
   3) School’s high graduate employment rate
   4) Parents’ advice
   5) Teacher’s advice
   6) Other

3. Do you have any certifications?
   1) Yes => go to Q3.1
   2) No
   3.1. How many certifications do you have?
      1) Less than 4
      2) 4 - 6
      3) 7 - 10
      4) More than 10

4. Upon graduation, do you plan to pursue an advanced degree?
   1) Yes => go to Q4.1
   2) No
   4.1. Select desired level.
      1) 4-year university
      2) Graduate school

5. Upon graduation, do you plan to find a job?
   1) Yes => go to Q5.1 – 5.3
   2) No
   5.1 What size companies interest you?
      1) Large company
      2) Upper middle size company
      3) Small and middle size company
   5.2 What position level are you seeking?
      1) Entry level
      2) Low level skilled position
      3) Middle level skilled position
      4) High level skilled position
   5.3 What is your expected salary? (USD)
      1) Less than 1,000
2) 1,000 – 1,500
3) 1,500 – 2,000
4) More than 2,000

School Resources

6. Please respond to the following phrases utilizing a response from the ratings below. Select the rating that most clearly and honestly reflects your opinion:
   a. Classroom conditions
   b. Computer labs/Computer access
   c. Library
   d. Recreation facilities
   e. Practical training resources (facilities, equipment, machines, etc)
   f. School programs (curricular and after school programs)
   g. Career counseling
   h. Teachers
   i. General school life

<table>
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<th>Very dissatisfied</th>
<th>Dissatisfied</th>
<th>Neither satisfied nor dissatisfied</th>
<th>Satisfied</th>
<th>Very satisfied</th>
</tr>
</thead>
</table>

7. To what extent does a scholarship and/or any other financial support cover your course fees, residential costs, academic materials, etc.?
   1) All
   2) Most
   3) Some
   4) None

8. Do you receive career counselling?
   1) Yes => go to Q8.1
   2) No
      8.1 Is the counselling helping you navigate your career plans?
         1) Yes
         2) No

9. How many hours per week do you receive practical training at school?
   1) Less than 10
   2) 11 – 15
   3) 16 – 20
   4) More than 20

10. Do you think the school is preparing you adequately, skill-wise, to find a job?
    1) Yes
    2) No => go to Q10.1 and 10.2
       10.1. Did you receive additional training, aside from in-school practical training?
1) Yes => go to Q10.1.1
2) No

10.1.1. How many hours per week do you train?
1) Less than 10
2) 10 – 15
3) 16 -20
4) More than 20

10.2 Are you planning to receive additional training from a training institute after graduation?
1) Yes
2) No

Enterprise Linkages

11. Did you receive practical training from the company?
1) Yes => go to Q11.1-11.9
2) No => go to Q12

11.1 Did the school locate the company?
1) Yes => go to Q11.1.1
2) No => go to Q11.1.2

11.1.1 How did the school locate the company?
1) Via formal contract
2) Via informal relationship

11.1.2 How did you locate the company?
1) Parents and relatives
2) Friends
3) Advertisement
4) Other

11.2 What is the size of the company?
1) Less than 50 employees
2) 50- 100
3) 101-500
4) More than 500

11.3 Were you paid?
1) Yes => go to Q11.3.1
2) No

11.3.1.1 What is the hourly wage? (USD)
1) Less than 5
2) 5 – 10
3) 11 -15
4) More than 15

11.4. Did you receive allowance for lunch and transportation?
1) Yes
2) No

11.5. As a trainee student, what were your tasks and duties? ________________
11.6. Do you think the in-company training is relevant to your studies?
   1) Yes
   2) No

11.7. Do you think the in-company training will help you find a job?
   1) Yes
   2) No

11.8. Please respond to the following phrases utilizing a response from the ratings below. Select the rating that most clearly and honestly reflects your opinion:
   a. Overall in-company training program
   b. Level of tasks and duties
   c. Relevance of in-company training to your studies
   d. Teachers and assessors for your training
   e. Working environment
   f. Number of hours per day
   g. Duration of in-company training
   h. Wages or allowance

<table>
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<tr>
<th>Very dissatisfied</th>
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<th>Neither satisfied nor dissatisfied</th>
<th>Satisfied</th>
<th>Very satisfied</th>
</tr>
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</table>

11.9. Have you ever left your position?
   1) Yes => go to Q. 11.9.1
   2) No
      11.9.1. Please provide a reason _____________________

12. What is the main reason you have not received in-company training?
   1) I feel it’s necessary, but I cannot not find a company
   2) I feel it’s necessary, but I don’t have enough time.
   3) I feel it’s necessary, but I don’t have the financial support.
   4) I feel it’s not necessary to my career goals.
   5) I am not interested.
   6) Other
Annex 3: Interview Questions for Teachers

1. Define “an excellent school”.
2. In your opinion, what factors are attributed to your defined “excellent school”? How and why do they impact school outcomes, e.g. graduate employment rates?
3. Do you believe that your school has adequate resources (both financial and human) to enhance the employability of your students?
   - If yes,  
     - Please explain why  
     - In your opinion, how do these resources impact school outcomes?
   - If not,  
     - What challenges does the school face in maintaining adequate resources?  
     - Why do these challenges arise?
4. Do you believe that your school’s resources (both financial and human) are efficiently utilized?
   - If yes, please explain why
   - If not, what are the challenges to maintaining internal efficiency?
5. Do you believe that the school provides the most relevant and updated skills to enhance student employability?
   - If yes,  
     - Please explain why  
     - In your opinion, how does this area impact school outcomes?
   - If not, what challenges does the school face in developing relevant programs?
6. Do you believe that your school is a well-managed school in terms of leadership and governance?
   - If yes,  
     - Please explain why  
     - How does it impact school outcomes?
   - If not, what challenges arose and why?
7. Do you believe that your school has strong enterprise partnerships in the areas of resources, teaching, and management?
   - If yes,  
     - Please explain why  
     - In your opinion, how do these partnerships impact the high employment rates of your students?
   - If not,  
     - What challenges does the school face in developing linkages with companies?  
     - Why do these challenges arise?
8. Among the previous four factors, which factor had the highest impact on the success of schools (high employment rates of your students)? Provide an example within a specific context and time.
9. Based on personal experience, what are your suggestions on how to improve your identified factor?
10. How has your school successfully overcome both internal and external challenges? Provide an example within a specific context and time.

11. In your opinion, to what degree has the government’s TVET policies (e.g. collaboration, quality assurance system, financial mechanisms, and articulation) impacted your school’s governance and policies? Explain how.
Annex 4: Interview Questions for Students

1. Why did you select this particular school? What were your expectations?
2. Are you satisfied (or dissatisfied) with your choice of this school? Please provide details in regards to the curriculum, facilities, teachers, etc.
3. Do you believe that your school is a top performing institution? Please explain why/why not.
4. Upon graduation, are you planning to pursue higher education or enter the labour market? Explain your decision.
5. In regards to career, what desired level do you aspire to secure on hire? Do you think it is necessary to earn a university diploma to acquire this desired job?
6. Do you think the school provides adequate practical training in order to secure a job? If yes, please describe. If not, what are the primary challenges?
7. Do you believe that your school is helping you build your future career plans? Who helps you the most? How do they help you?
8. Do you think the school stimulates and supports your creative development? If so, please describe any existing programs and how they stimulate your creativity. If not, what are the primary challenges?
9. If you have completed in-company practical training, please describe your experience.
10. Do you think in-company training should be formally organized and a part of the school curriculum? Please explain why/why not.