Training Performance Gap Analytics

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Overall Summary

This summary is intended to serve as an illustration for what can be done in analyzing factory training performance gap. Thus, X group was selected for the demonstration purpose. Since the structure of the engineers and technician (wwid) have similar layouts, future reports will easily incorporate other groups such as L, M, D, M, P, etc.

Working Environment

Considering the factory training analytics will be a permanent report, therefore, it is important to build a defined working environment as illustrated below:
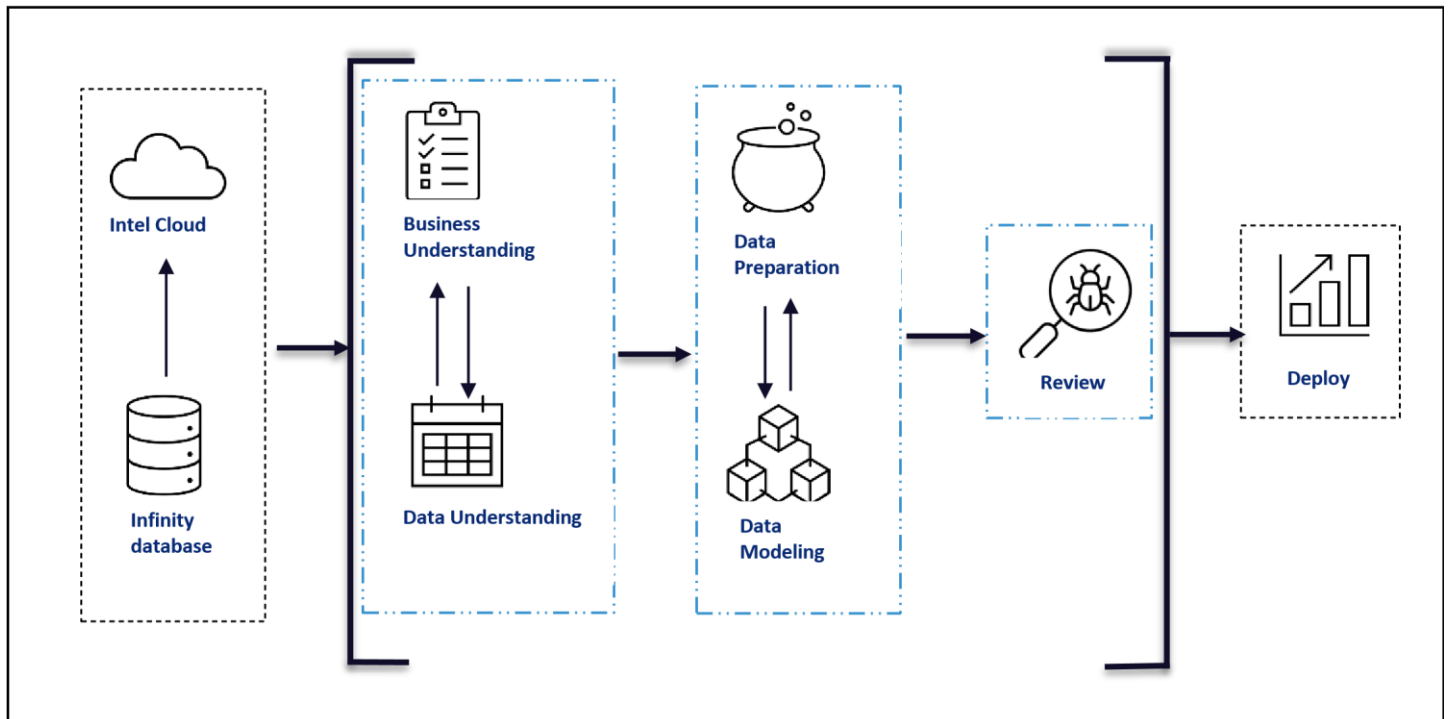
Fig1. Factory Training Analytics Architecture

This factory training analytics architecture is based on how I developed the training analysis for the X group. I strongly believe this data architecture can serve to expand the training analysis to include all desired groups. I can simplify this data architecture into the following business flow.

Database • Data Source

IDE • Data Analysis

Power Bi • Dashboard
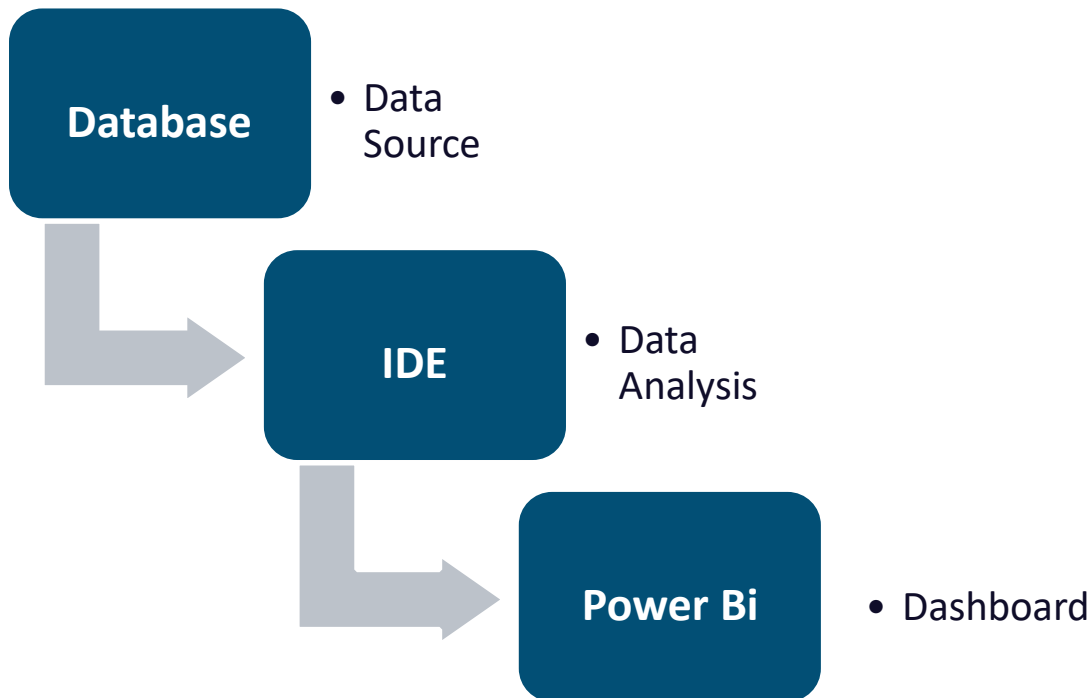
Database

The data source used for the X training analysis is infinity with manual query from my personal account. Moving forward with the expansion of the training analysis to other modules, it would be necessary to get global access. In the past, I have designed some databases (I did it when I was working at Microsoft Azure Support-Redmond, WA) and I know it is possible to get direct access to a database with control level by the database administrator. I don't how if there is a dedicated infinity database or if infinity is tied with couple applications, but if there is a need for me to figure out the database system, I can do it. In addition, to automate the training analysis report, we would need to either get a liveconnect access or a pull to a cloud environment such as Onedrive or Sharepoint.

Integrated Development Environment (IDE)

I used Microsoft excel on this report. Although I think excel is still useful, we need an IDE that works well with big data such as python IDE or Rstudio or Microsoft Visual Studio. I know for sure some ABC teams like automation or data-oriented teams would have an IDE. I think it would be easy to find out if ABC has IDE subscription based or perhaps, we will need to get one. Microsoft visual studio can integrate several programming languages and connect to Power Bi and different servers. It is also important for this IDE not to be private (not tied to my account only) otherwise it would not work. The server hosting infinity data is not tied to my account. Thus, we need the IDE to have a space allocated. Moreover, we would need python or R programming (I am more familiar with these two) to be able to answer some questions like those I raised for my analysis and to build complex charts like the one below if needed.
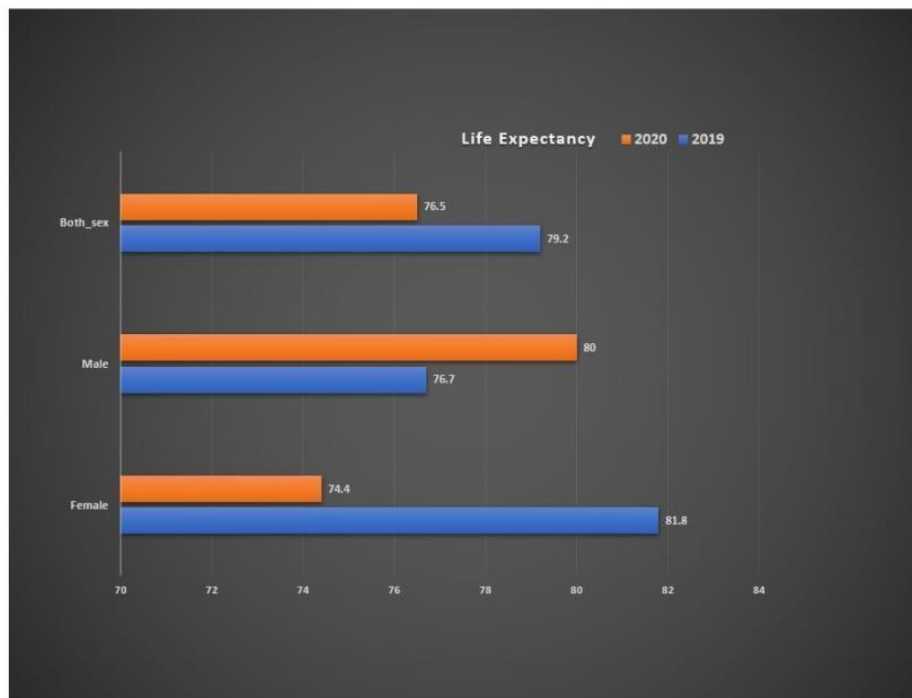

Figure 7: Fig8. Comparing the 2019 and 2020 U.S. Life Expectancy at Bith for both Sex

Source: my own work from my GitHub account. https://github.com/asmozo24/Research_Project-Capstone/blob/main/Data698_Final_Research_Project.pdf

Dashboard

I think we have a solution with Power Bi. Power Bi offers a connection to workbook on OneDrive, or SharePoint online. This option will facilitate the automation process flow end-to-end. Power Bi also allows scripting languages such as python or R. However, we would need to upgrade the Power Bi version to a premium version. I used the basic Power Bi Desktop for my data visualization. In addition, we would need a space allocated to host the dashboard like Workspace or SharePoint.

I want to mention that there is another option that can be used to automate the training analysis report beside the method I described above. Microsoft Power Automate can automate workflows between apps and services. I am not experienced with power automate but I can learn and use it to build a business solution end-to-end with connection across Microsoft platform. If I had to make a choice, I will go with the first method.

Data Governance

I am adding the data governance on this project because there would be a need to grant access to the generated report. Although ABC has policy on the use of data, we would need to define some rules to ensure the data manipulation in this project does not violate ABC policy.

Business Objective

Although the X training analysis did not outline business objective, I was able to find some flows that can be improved. Training performance targets trainee certification status.

Training gap

Current State

Desired State

Steps to close the gap
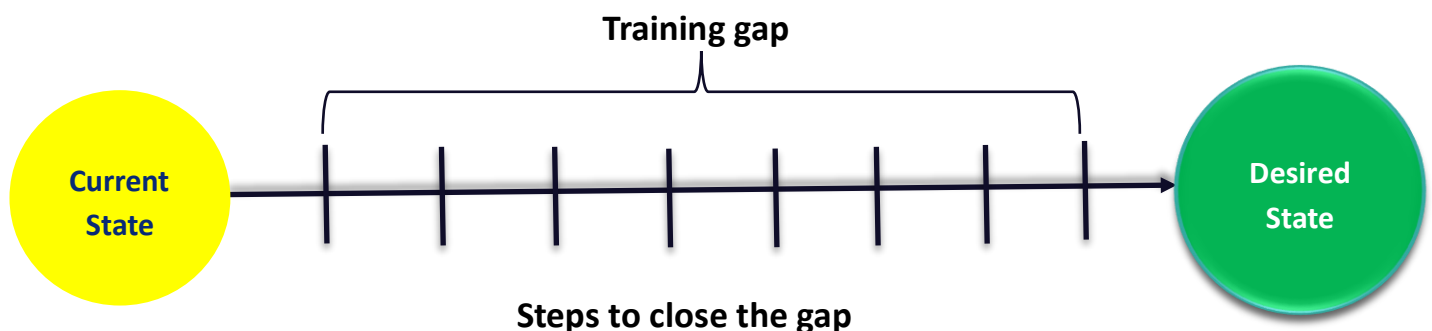
Table1. Training Performance Action Plan

Current Training State	Desired Training State	Actionable
70% certified in L2q Quality Buddy	85% certified in L2q Quality Buddy	Manager to define a structured training package. Manager to have dedicated staff to cross train in all modules

I think the stakeholders can define the desired training state if we know the current training state. To find the current state we will need to evaluate the current training performance for each module with key targets on the training package names (This is just an example, the target could be a shift or manager). Then, I could perform a forecast to have a projection that can serve the business needs. Thus, the desired training state will take into account the current training state and other considerations beyond my duties. The milestone can be approximated based on the data analysis with emphasis on machine learning, for example, maybe average numbers of days it takes for wwid to be certified under manager/package names/level/ etc. To visualize the percentage goal (desired state) certified against current/actual certified, in other words to visualize the delta (gap), we need to have a defined milestone per quarter (as an example). This business objective is more of a suggestion or like a proposition because I don't think it would be part of this project.

Summary-X Training Analysis

Charts Description

I published the Power Bi report to my workspace. This was the only option I was getting when I was looking for a location that could host the dashboard. Also, I only focused on certified wwid technicians since the data has a lot of incongruities. Thus, introducing bias in the data transformation.
Such data are not good for the report.

Page 1

Count of distinct/unique trainees. HR jargon would say headcount. I want to say these are wwid who have been assigned some training whether completed or not. The first pie chart shows the number of wwid by module teams (X TEL and X HIT/LAM/AMAT all shift and level included. For the second pie chart, I tried to see the count of wwid per shift and for the 3rd pie chart I wanted to show count of wwid per level of training. The large chart at the bottom shows the progression of this wwid count from 2013 to 2022. There is a filter option to play with and see these wwid counts under variables.

Page 2

These pie charts show wwid certified only. I added the different legends to show more certified count distribution under specific variables. I selected these variables because I thought it would be relevant for decision making. For example, if a manager knows the number of certified per level for specific package names, then the manager would have insights enabling him/her to orient the available training resources.

Page 3

These line charts show the trendlines for the count of certified by shift and level. The 05 lines represent the different shifts and 03 charts represent the different level of training (L1,L2 and L3).

Page 4

This bar chart shows the progression of certified from 2013 to 2022. The detail on this chart is about the training completion time. This chart is answering the question about whether the assigned training was completed on time or not. I think in training performance, it is important to assess the effectivity of the training. A training completed on time makes a team stronger whereas a training not completed on time put a team under stress especially when coverage is needed. The actionable from this finding is for manager to find out why the training is being delay. Is it the trainee lack of motivation or is there a problem with the availability of the trainer or is it the lack of training resources?

Page 5

This bar chart shows the progression of certified from 2013 to 2022 by shift all other variables included (levels, module teams, overdue status, etc.). The filter can help zooming in if the view is interested in other details. The takeaway from this chart is to capture the training performance for each shift. What shift does well in training wwid? Knowing this information can help other shift that are lacking behind to copy the champion key success.

Remarks

This report is for D1 LTD X training.

- There are some bias in the data.

- Missing date on the target_start_date, target_completion_date

Wwid	Name	Level	Package Name	Package Short Name	Process	Target Start	Target Completion	Completion Date
11580348	De Luche, Samuel	1	L1e P12xx Hitachi HS-9050 (HIN)	L1e HIN	1222			
11580348	De Luche, Samuel	1	L1e P12xx Hitachi HS-9050 (HIN)	L1e HIN	1231			
11580348	De Luche, Samuel	1	L1e P12xx Hitachi HS-9050 (HIN)	L1e HIN	1274/5			
11580348	De Luche, Samuel	1	L1e P12xx Hitachi HS-9050 (HIN)	L1e HIN	1276/7			
11933966	Mullen, Andy	1	L1o P12xx TEL Tactras CU (TAO_TVO_GTA_GTO)	L1o TAOTVOGTAGTO C	1222			5/3/2022
11933966	Mullen, Andy	1	L1o P12xx TEL Tactras CU (TAO_TVO_GTA_GTO)	L1o TAOTVOGTAGTO C	1274/5			5/3/2022
11933966	Mullen, Andy	1	L1o P12xx TEL Tactras CU (TAO_TVO_GTA_GTO)	L1o TAOTVOGTAGTO C	1276/7			5/3/2022

- Incorrect date: completion date lower than the target_start_date

level	package_names	package_short_names	process	target_start_date	target_completion_date	completion_date
3	D1 REX/GRX Authorized Engineer	REX/GRX AE	1272/3	1/2/2020	4/2/2020	10/9/2019
3	D1 REX/GRX Authorized Engineer	REX/GRX AE	1274/5	1/2/2020	4/2/2020	10/9/2019
3	D1 REX/GRX Authorized Engineer	REX/GRX AE	1276/7	1/2/2020	4/2/2020	10/9/2019
3	D1 REX/GRX Authorized Engineer	REX/GRX AE	1278/9	1/2/2020	4/2/2020	10/9/2019
	BE Etch LTD/LTD-M Interviewing Cert	Interviewing Cert	1274/5	10/21/2022	10/31/2022	10/1/2021
	BE Etch LTD/LTD-M Interviewing Cert	Interviewing Cert	1276/7	10/21/2022	10/31/2022	10/1/2021
	BE Etch LTD/LTD-M Interviewing Cert	Interviewing Cert	1278/9	10/21/2022	10/31/2022	10/1/2021
3	D1 FE Etch xNT/GTX Hoist-Lift Authorized Engr	Hst-Lft xNT/GTX AE	1272/3	3/14/2022	6/30/2022	10/16/2017

- Managers need to do more housekeeping on infinity.

- There are some backend design improvements needed.

The trend line for certified fluctuates a lot. This is a sign that training is not systematic. Training varies from one package name to another or from one level to another or from one shift to another.

Proposed solutions

Managers

- They need to have a reasonable completion date

- They need to correctly log trainee start date and completion date.

- They need to log reason why trainee did not complete training on time.

- They need to log trainee in training if indeed in training or not in training (situation like vacation or no trainer available or opportunity no available etc.) and provide reason.

- They need to choose an appropriate target completion date close to the average completion date on the team or package name.

- This report can serve as reference to view average completion date per package name per shift per level to estimate completion time for new trainees.

Backend

There is a need to add a field to capture in training time and reason for trainee not being in training or not completing training within the expected time. There is a need to add more constraint on each entry field to avoid completion date being shorter than start date.

There is a need to have trainers (as primary duties and other duties as secondary) available for each team or few trainers per shift with cross team training ability.

Questions

What is the retention rate (metric that measures the number of trainees still working under a manager after a given period (quarterly)?

Who are the wwid with the longest years of experiences under (manager/package name/module teams)?

What are the wwid with the least years of experiences under (manager/package name/module teams)?

What are the most certified wwid?

How many wwid certified in each module teams (overall/selected year)?

What is the average certified by month/year/shift/level/package?

What is the average total days before certification by month/year..filter on shift/level/package?

What is the percentage average total days before certification by month/year...filter on shift/level/package?

What is the percentage certified by month/year/shift/level/package?

Plot showing percentage certified in the current month against the percentage average certified by month or the actual month.

Plot showing progression of certified, certified overdue, certified not overdue by year?

Dashboard Samples

Looking at certified employees over the past 9 years.
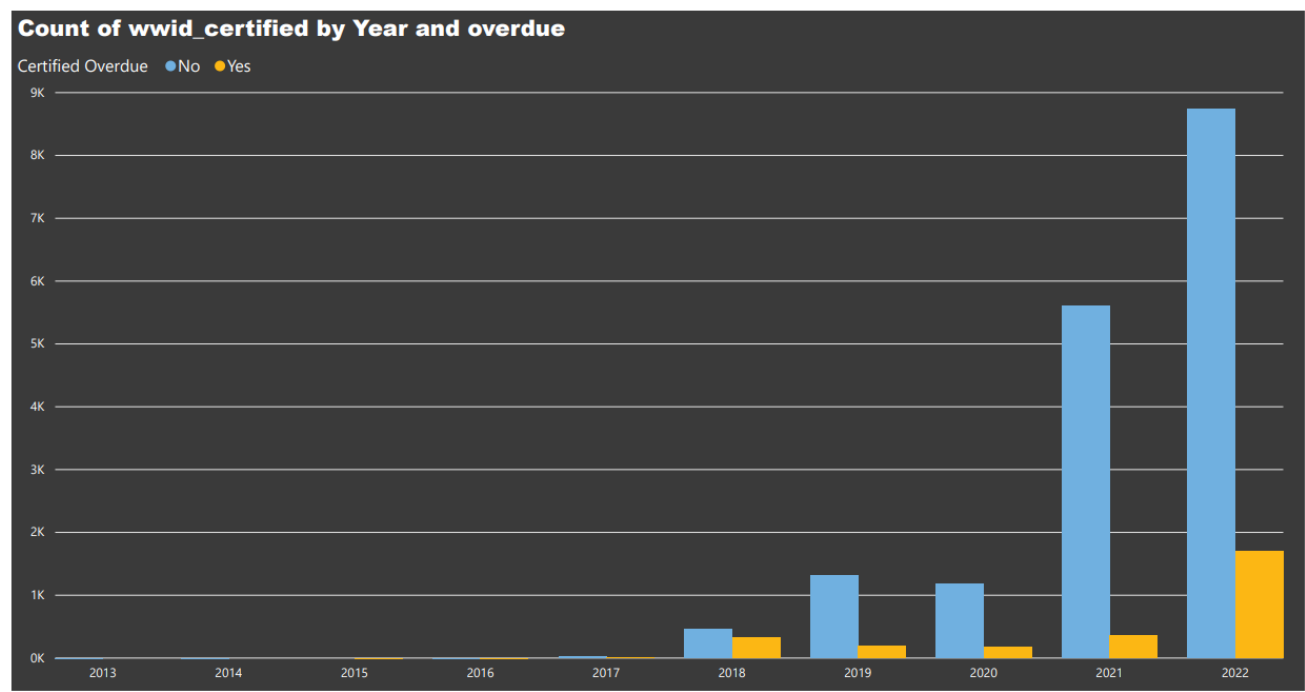
Looking at the staff distribution by shift and level of certification.