

PONTIFICIA UNIVERSIDAD CATÓLICA DE VALPARAÍSO
FACULTAD DE FILOSOFÍA Y EDUCACIÓN
INSTITUTO DE LITERATURA Y CIENCIAS DEL LENGUAJE



ESP for Mining Industry Mechanics and Supervisors:

A Flipped Classroom Methodology

TRABAJO DE TITULACIÓN
PARA OPTAR AL TÍTULO DE PROFESOR DE INGLÉS
Y AL GRADO DE LICENCIADO EN EDUCACIÓN

Estudiante: Miguel Zamora Morales

Profesora Guía: Mónica S. Cárdenas-Claros

Primer Semestre 2016

ACKNOWLEDGMENTS

To the people who have always been with me and to those who are not with me anymore

To my passionate love: thank you very much

To my parents who never gave up on me

To my teacher for her support and guidance

“You believed.

You believed in moments not conceived.

You believed in me.

A passionate spirit.

Uncompromised

boundless and open.

A light in your eyes, then, immobilized.

Vacant, broken.

Fell at the hands of

Those movements that I wouldn't see.

Cause it was you who prayed for me so.

What have I done to be a son to an angel?

What have I done to be worthy?

Day light dims leaving cold fluorescence.

Difficult to see you in this light

Alright, now it's time for us to let you go.”

Wings for Mary, Tool (2010)

ABSTRACT

The mining industry is very important not only for our country but also for international enterprises as they work together to build the processing plants necessary for the material extraction.

Hence, this project seeks to teach mining supervisor mechanics to interact with foreign workers in charge of the assembling process supervision using a flipped classroom methodology.

Key words: mining, flipped, ESP

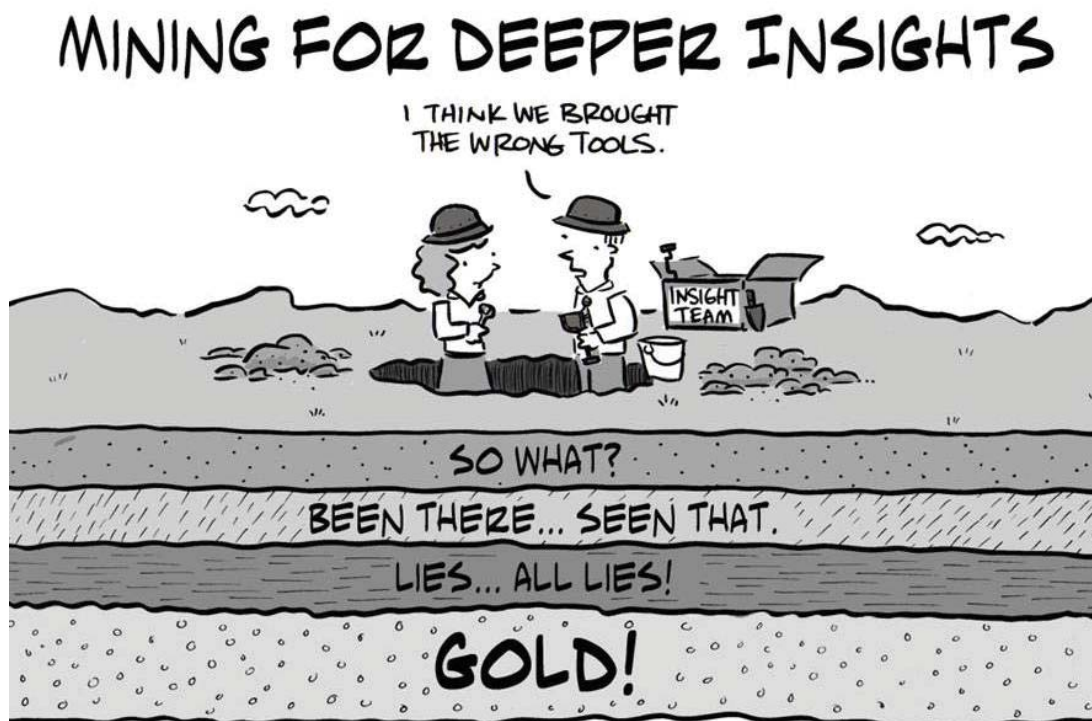


TABLE OF CONTENTS

Introduction	1
Literature review	
1. Contextualization	4
2. English for specific purposes	6
3. Vocabulary in L2	6
4. The use of ICT in Chile	8
5. Using ESP with flipped methodology	9
Pedagogical proposal	
1. Course Syllabus	11
2. Course Description	11
3. Course Organization	11
4. General Objective	12
5. Syllabus Design	13
6. Assessment	14
Sample lessons	
1. Unit 1: Lesson 1	17
2. Unit 2: Lesson 1	21
3. Unit 3: Lesson 1	27
4. Unit 4: Lesson 1	32
5. Unit 5: Lesson 1	36
Appendix	
A. Questionnaire	41
B. Needs Analysis Results	42
C. Class Blog	49
D. CD	50
References	51

INTRODUCTION

Copper mining is one of the most important economic pillars in Chile. In order to extract this mineral, mining companies follow different stages. Briefly, they start by hiring qualified personnel to plan the extraction; secondly, they extract the ore from the mine and concentrate it, then it is crushed and grinded, among other processes to be able to get material from the mine, and lastly, they take the collected raw material to different processing plants. Copper processing start with the processing plants building. The responsibility of assembling the machines that are bought from international companies – mills, and crushers are examples of these machines – is entirely of the mechanics who work for the Chilean company. Moreover, vendors send supervisors to the customer's plant to oversee the assembly process wherever the plants are located.

In the course of assembling the processing plants, inspections are likely to occur while the constructor company's personnel are working. Such inspections are carried out by foreign supervisors which trigger opportunities of interaction between the vendor's supervisor, Chilean mechanics and foremen, among other workers. The interaction between these parts often becomes misconstrued due to the national worker's lack of English-language knowledge. So, why is this project important for mechanics and foremen in the Chilean mining industry? Precisely because the language barrier that exists between the foreign supervisor and the Chilean mechanics and foremen makes the communication less effective; therefore, the procedure or the job itself becomes more difficult.

This difficulty in communication has been addressed through a number of initiatives. A mining industry company that has tried to train its employees in the use of the English language is Minera Los Pelambres, Antofagasta Minerals PLC. According to its Human Resources Manager, Humberto A. Fernandois, this company "...needed to develop English-language skills for interaction with managers, to prepare them for visits and technical inspection from outside the company" (ETS, 2007). Even though mining companies like Minera Los Pelambres invest in English-language training programs for managers to prepare them for technical inspections from outside the business, there are contractor companies that are left aside in this training process. Hence, the importance of

designing a course that includes the workers that are not being considered in this day by big companies.

Most mine workers start their careers at a young age, but it is not until they have acquired knowledge on their fields – and after years of hard work – that using the English language becomes a necessity; therefore, designing a course that addresses adult learners suits best. Likewise, this project aligns with standards proposed by the INACAP Institute and its industrial maintenance and mechanical engineering program. If there are any workers who graduated from this program, during two semesters of their studies, they are immersed with the English language in a transversal course offered to all the programs imparted at this institution. Although the English content imparted is the same throughout all the careers, it is not addressed to students' needs (INACAP, 2016).

Thus, this course is designed for beginners, as most of the workers' knowledge on the English language is limited to some random words that belong to what their area of expertise involves. Consequently, most of the words foremen and mechanics master are not used in complete sentences, much less with correct grammar, and the interaction between the foreign supervisors from the processing plants and the Chilean workers becomes faulty.

Due to the workers' schedules of ten hours per day in shifts of fourteen days and seven days of rest, they do not have time to attend a face-to-face class at a regular language institute. Moreover, institutes usually offer courses centered on general, communicative English that do not address this type of students' individual needs. Due to this reason, the course is created to fulfill the students real necessities, so students will be able to interact with foreign assembly supervisors from the processing plant in the mining industry.

On the other hand, as workers' jobs are far from their hometowns due to the mines' locations—the inlands of northern Chile—most of them use their cell phones to keep in contact with people by talking to them, looking at pictures or, in other cases, watching videos. For that reason, the class will use a flipped or inverted methodology. In brief, this means that contents will be sent to students for self-study in advance in the format of short

videos. This will allow them to check the material depending on their availability and check it at their own pace—they can rewind, fast forward or replay as necessary.

As a conclusion, the lack of time to study a foreign language by mining workers, and the hours they spend using their cell phones at leisure time, allowed me to think of a self-study methodology: Flipped classroom, which promotes the delivery of content in advance, so learners—in this case foremen—can study at home through explanatory videos with vocabulary and specific grammar points. Although grammar is an important part of the course, all the information sent will not be isolated from context, taking into consideration not only the environment but also the students' needs.

LITERATURE REVIEW

This section reviews the three main strands that my project is constituted by: vocabulary, use of ICTs and flipped learning.

Whereas English teaching is in *vogue*, it not always addresses students' needs, especially in connection to each individual's workplace and availability. That is why there are cases in which the English teaching turns more effective when taught for suiting students' specific purposes. First, I start by contextualizing the mining industry in Chile. Then I will review the three main topics of this graduation project: ESP, Formulaic Expressions and Flipped classroom methodology.

Contextualization

The mining industry in Chile

Chile has been known by its mining industry throughout time, being copper mining one the most important (apart from gold and iron). Since 1990s, the mining industry in Chile has seen an important growth due to Foreign Direct Investment (FDI). According to the Foreign Investment Committee, "in 2006 mining was the largest recipient sector of FDI, receiving US\$1,159,211,000 in investments. Furthermore, mining projects in Chile are expected to generate approximately US\$18.5 billion in investments between 2006 and 2015" (Amchamchile, 2008: 1-2). Copper has become quintessential for the Chilean economy and very few people may seem to think that its heyday may soon be over; in fact, one third of the world's copper is produced in Chile weird name

As the national mining industry is part of a global net, which includes the investment from foreign industries, having trained workers to understand and communicate in other language -- in this case in English -- seems to open new doors to the future of these organizations.

"Minera Los Pelambres" is the perfect example of how national organizations are preparing themselves for the future by certifying 60 percent of their personnel: supervisors and managers. According to the company's Human Resources Manager, this became a necessity as their workers needed to improve their English-language skills as they are constantly subject to inspections from outside the company. (ETS, 2007). Moreover, the

company not only invests in English-language training courses, but also uses the TOEIC test to evaluate the level of its workers and estimate if those courses have been successful or not; “The TOEIC test helps Minera Los Pelambres decide which potential employee is best adapted to its needs” (ETS, 2007, 1). Workers are tested to figure out how they perform in different situations, under different conditions where the English language is needed.

As a matter of fact, *Pelambres* is part of an English program that it is also taught at other mining companies not only in Chile, but also in different countries such as Mexico, Peru, Canada, the United Kingdom. These companies have incorporated one or two-day courses and different conferences related to social responsibility and environmental problems to improve their workers’ knowledge on the English language. (Programa Ingles Pelambres). These activities are strongly related to what Mr. Fernandois explains about the company’s program: not only people need to be ready for foreign technical inspections, but also they have to have the competences to understand different activities imparted by foreign experts in another language that is not their mother tongue such as lectures about the mining industry development.

Technical inspections from outside the country are very common in the mining industry as engineering, construction, and project management companies deliver their services worldwide. That is the case of Bechtel, an American contractor company expert on construction and inspection. This company has been part of different projects in Chile, leading to the progress of our most important market.

Most of the projects carried out in Chile in alliance with foreigner’s companies, have led to the need of training Chilean supervisors by developing English-language skills to interact with workers from enterprises like Bechtel. This company has “built the original copper concentrator at Chile’s Los Pelambres Mine, north of Santiago and east of Salamanca, between 1996 and 1999.” (Bechtel, 2016). This company returned in 2001 to add new parts to the old machines, making the interaction between Chilean and foreign workers possible one more time. Under those circumstances, having an employee competent at communicating in English becomes essential but it must be remembered that the process of learning may include different steps, starting with the most relevant vocabulary related to the discipline.

English for Specific Purposes

According to Hutchinson and Waters (1987: 19) English for Specific Purposes - or ESP for short - is a method of learning a language that addresses the students' needs. In other words, ESP does not focus on a target language or a methodology in particular, but its foundation is addressing the students, their context and their special needs; it aims "preparing learners to communicate effectively in the tasks prescribed by their study or work situation" (Dudley-Evans and St John 1998: 1)

As ESP relates to specific disciplines, it is classified into two main groups: English for Academic Purposes (EAP) and English for Occupational Purposes (EOP). According to Dudley-Evans & St. John (1998), EAP - refers to any English teaching that relates to academic study needs. In other words, anyone who is willing to learn English as a vehicle to improve the person's knowledge on a particular academic topic (e.g. the reading of research paper) may be subject to an EAP class. According to Robinson (1991), the second approach - EOP - involves work-related needs and training. To that matter, EOP includes professional purposes in administration, medicine, law and business, and vocational purposes for non-professionals in work or pre-work situations. By and large, the *English for Occupational Purposes* approach is aimed at those people who have a job that does not require academic studies (such as a university diploma).

As noted previously, EOP fits accurately the design of this graduation project, as a large group of mechanics in the mining industry is not familiarized with English. The Chilean mining industry has expanded since the 1990s so there is a need to instruct workers not only on the use of a foreign language, but also with opportunities to learn and use it with relevance in their local and work contexts.

Vocabulary in L2

If people were asked to define the word *vocabulary*, they would probably relate it to words, but it is important to understand that there is more than meets the eye. Words are fundamental for communication, but it includes not only single words, but also lexical chunks that are learned by children and adults as single units (e.g. thank you very much).

Vocabulary is central to English language teaching because without sufficient vocabulary students cannot understand others or express their own ideas (Tesol, 2.) As Tesol explains,

when trying to communicate, grammar can be left aside; on the contrary, without words, people cannot transmit a message. Thus, with a few words people can deliver a message and understand it effectively; the more fluent a person gets, the more they need to acquire vocabulary knowledge. As vocabulary is very important for second language learners, two main theories about how vocabulary is acquired have arisen to understand this process: implicit and explicit vocabulary learning.

Implicit learning relates to the acquisition of new word meanings unconsciously; the focus is on the message, not the form. The exposure to the language in different contexts, leads to the learning of new vocabulary. On the other hand, explicit learning takes words out of context; before people comprehend a text, they need to understand the 95 percent of the words. For this reason, learners have to rely on note taking and consulting dictionaries to acquire new vocabulary.

Although, explicit and implicit vocabulary acquisition hypothesis are two opposite views of the same process, they both are complementary: *basic vocabulary should be taught to students as soon as possible and that vocabulary learning through contextual guessing should be delayed until learners have mastered the basic vocabulary* (Wang Dakun, 2000: 16).

When dealing with adult learners, it turns vital to ask oneself if what the each of them needs is vocabulary in isolation so that grammatical features can be inferred from them (*mill* and its plural *mills*) or the other way around. It is interesting to think how people may store new vocabulary in their brains. “Thus the important question is whether to facilitate processing, forms and formulaic sequences that occur frequently in language (*fish and chips* or *Watch out!*), are stored” (Conklin and Schmitt, 2012).

Formulaic sequences are part of our language and most of native speakers seem to master these prefabricated sentences at a proficient level, making communication easier; however, it is known that at an early stage, not only second language learners, but also first language learners need to grasp to this *formulas* for them to start the process of communication. In addition, apart from being helpful at early stages, formulaic expressions help language users to sound more fluent as “they offer processing efficient because single memorized units, even if made up of a sequence of words, are processed more quickly and easily than the same sequences of words which are generated creatively” (Wray 2002: 9); Multi-word

unit that carries with it just one meaning, makes it easier to express what people want to express.

Even though these multi-word units seem to be fixed word sequences, they appear to be processed and learnt as wholes, as in commands like *go to work!*; some of them are completely fixed strings of words, whereas some others, have slots in relation to the fixed element. Eg. *Watch out!*; *Go to work/ your room/bed*. Those sentences can be filled with semantically appropriate words, although, sometimes there are rules that control which words could be used. In that sense, we can call these sentences flexible, as they adapt themselves to the different circumstances.

With different circumstances, come different functions or certain responses from people, such as *requests* and *directions*. As a result of these functions, “sequences have the purpose of acting both as a social lubrication and of actively co-constructing interpersonal communication”. (Schmitt & Carter 2004: 8). The transaction of information in an accurate way is the most important aspect of these sequences: the idea is that a technical word can help carry out meaning in a particular field but technical vocabulary not necessarily will be limited to one or two words. Therefore, what workers can grasp will eventually suit them in other context if necessarily.

The use of ICTs in Chile

As mining companies are incorporating English as part of their training courses, it is probably common the use of digital devices as part of the lessons. However, the history of our country in terms of technology is completely different in terms of using technologies at schools and workplace.

Chile started with the experience of using computers in our school classrooms in the 1980s with the incorporation of a new program called “*Enlaces*” in 1992, which saw in technology a path to improve educational processes; “si el corazón de los procesos de enseñanza-. Aprendizaje late en la escuela, en la sala de clases, es en ella donde la política educacional debe poner el énfasis”. *Enlaces* had (at that time) two main objectives: teaching programming language and teaching students the use of that technology itself through a group of well trained teachers, being the second option the chosen one. Furthermore, *Enlaces* has always focused on the pedagogical aspect of the use of new technologies, been

approved a 200 million dollars budget related to infrastructure: computer and labs through a new plan called TEC created by Enlaces.

Although money has been invested in infrastructure, the gap between public and private schools in terms of the students' digital performances is still large, but efforts in order to solve this problem have been done: according to Enlaces, the president of Chile, Michelle Bachelet announced in 2015 the creation of a new program to solve the technology access and use gap called "Me conecto para aprender" (Enlaces, 2016).

The use of technologies in our classrooms is something that is getting more and more common in the last few years, leading to new methodologies that teachers are adopting to make the classes more effective. That is the case of "flipped classroom" or "inverted classroom". When Aaron Sams and Jonathan Bergmann decided to incorporate this methodology to their classrooms in 2006, they basically thought that. "instead of standing in front of students and lecturing to them, it was better to be among our students, helping them with difficult concepts and problems. We also knew that we needed to better incorporate problem- and inquiry-based learning into our classrooms" (Bergmann & Derrick, 2012: 1). Even though this approach has been implemented by teachers in the United States and Canada for 6 years, Chile seems to be far from that reality. Despite the fact that Chile is not as advanced as those other countries, in 2014 a professor at the Pontificia Universidad Católica de Chile, Ms. Lorena Barba, established the use of flipped classroom with engineering students: she delivered a lesson's content in advanced through videos. In class, she focused on solving problems, she said : "Hay que apuntar a que los alumnos asimilen y apliquen, dijo. Las etapas de una clase "flipped" son mirar (watch), pensar (think), dig deeper (pensar más profundo, ramificaciones, etc.), discutir (entregando miguitas de pan para que no se pierdan del contenido fundamental), descubrir y dar una vuelta a la página (find and flip)" (Inguccl, 2013).

Using ESP with flipped methodology

New methodologies have arisen from the use of new technologies to tackle the problem of communication between foreigners and natives in all areas (education, mining industry, among others) and the way how students need to be taught taking into consideration their special needs. Therefore this program is designed to work with specific learners' needs,

centered on language and genres related to the activity itself. Dudley-Evans and St. John explain that “...the main concerns of ESP have always been, and remain, with needs analysis, text analysis, and preparing learners to communicate effectively in the tasks prescribed by their study or work situation (Dudley-Evans & St. John p. 1)” Thus, the importance of teaching these learners using a communicational approach that will suit their particular mining context.

As an ESP class, this project will thrive to use a “Flipped Classroom” methodology. The idea of incorporating such contemporary methodology is, as (Butt 2014 p.33) the opportunity of “...taking advantage of the revolution that the Internet has been to educational in providing flexible access to course material...”. Granted, *Flipped Classroom* will allow students to be responsible for their own learning process by checking the materials and contents outside the classroom for self-study. Lessons will be part of the program in the form of interactive classes, where they will be able to work at their own pace by rewinding and fast-forwarding the videos that will be sent to their mobile phones or shared in their favorite social networks. According to Capital Online (2016), Chileans spend many hours checking their cell phones -- 3 hours and 30 minutes per day approximately – for that reason in this course students are expected to own a cell phone which they could use at a basic level; the use of this gadget will become an essential part of the learning process.

PEDAGOGICAL PROPOSAL

Course syllabus

Name of the course:

Type: English Mining (Elective ESP course)

Target: Assembly mechanic supervisors from the processing plant in the mining industry

Duration: 24 videos and 12 sessions, 90 minutes each (lesson)

Teacher: Miguel Zamora Morales

Email address: mlzamora.m@gmail.com

Course description

This is an elective ESP course designed for assembly mechanic supervisors from the processing plant in the mining industry who need to interact with foreign supervisors. The course is addressed to mechanic supervisors who need to, not only identify vocabulary chunks to understand and follow assembling instructions, but also interact with foreign supervisors by explaining assembling processes.

The syllabus of the course is informed by a need analysis (Appendix A) conducted with assembly mechanics from the processing plant in the mining industry. The results of the needs analysis showed five main aspects:

1. Mechanics have problems understanding spoken English;
2. Learning English is easier if adapted to workers' needs;
3. Workers do not have time to study;
4. Mechanics would like to spend one hour a week to check and review what they have learnt by themselves;
5. Watching videos in their cell phones would complement the learning process.

Course organization

This course is organized into five units which consist of videos sent to the students twice a week and complemented by a face-to-face class once a week. The course activities are hosted in a blog (englishforminers.wordpress.com) where students can check the material anytime and anywhere they want.

Unit 1 presents the general scenario where students work. Different vocabulary is shown to mechanics in order for them to learn words and vocabulary chunks to familiarize the mining processing plant.

Unit 2 focuses on the machinery in processing plants. Specific vocabulary related to mills is presented to introduce the different parts these mills are composed of.

Unit 3 presents vocabulary chunks related to following assembling instructions. Information from blueprints is used to introduce vocabulary.

Unit 4 concentrates on security in processing plants by describing warnings and relating vocabulary to commands.

Unit 5 centers on how mechanics must communicate with foreign supervisors by selecting information and vocabulary chunks previously taught, to explain different assembling processes.

General Objective

This course seeks to improve the communication between Chilean mechanics and foreign supervisors by working on their specific needs through a flipped methodology. By the end of the course, students will be able to explain assembling processes to a supervisor.

The materials that will be used include explanatory videos with the specific class topic information that will be viewed by the students prior to the face-to-face session, and a booklet with different activities where students will practice the contents informed – exercises, projects and collaborative tasks are part of it.

Unit 1 and 2 establish the general context: the machinery used in these assembling plants. In addition, specific vocabulary in connection to the machines' parts is presented and vocabulary chunks are introduced to recognize the general process the raw material goes through and for the specific machinery applied in each of the steps.

Unit 3 uses blueprints and manuals' information to introduce vocabulary to assemble different processing machines, while Unit 4 focuses on the safety rules in the processing plant.

Whereas Units 1, 2, 3 and 4 focus on specific vocabulary chunks (processing plant, machinery, instructions and safety) ; Unit 5 recalls vocabulary from all the previous units to

be used in a dialog between a mechanic and a foreign supervisor, either to explain assembling processes or give commands.

Syllabus Design

<p><i>Unit 1</i> Processing plants (4 videos and 2 sessions)</p>	<ul style="list-style-type: none"> • Familiarize with processing plant. • Memorize vocabulary related. • Select vocabulary items that describe processing plants from the mining industry. • Use vocabulary in commands. • Reflect on student's own learning and make comments on the course's blog.
<p><i>Unit 2</i> Machinery in processing plants (6 videos and 3 sessions)</p>	<ul style="list-style-type: none"> • Recognize SAG and BALL mill parts. • Memorize vocabulary related to SAG and BALL mill parts • Select vocabulary used in machinery • Use vocabulary in commands, presented in assembling processes for SAG and BALL mills. • Reflect on student's own learning and make comments on the course's blog.
<p><i>Unit 3</i> Assembling instructions (6 videos and 3 sessions)</p>	<ul style="list-style-type: none"> • Identify vocabulary chunks in blueprint instructions and manuals. • Paraphrase information taken from blueprints and/or manuals. • Use vocabulary chunks to understand assembling instructions. • Select vocabulary to complete a blank manual or blueprint. • Assessing vocabulary chunks in conversations. • Reflect on student's own learning and make comments on the course's blog.
<p><i>Unit 4</i> Safety in processing plants (4 videos and 2 sessions)</p>	<ul style="list-style-type: none"> • Identify security warnings. • Recall vocabulary chunks to express commands. • Relate vocabulary to commands. • Apply vocabulary chunks to express commands. • Reflect on student's own learning and make comments on the course's blog.
<p><i>Unit 5</i> Interaction with supervisors (4 videos and 2 sessions)</p>	<ul style="list-style-type: none"> • Recall vocabulary related to instructions, commands and the assembling process. • Select information and vocabulary to use in different situations. • Practice vocabulary chunks to be used in conversations in a particular context. • Explain assembling processes to another (or foreign) supervisor in a dialogue. • Reflect on student's own learning and make comments on the course's blog.

Assessment

Through the course mechanics (supervisors) will be assessed in two different ways:

Evaluations	%	Description
5 hands-on vocabulary activities (Dialogue)	90 x 18 points each	Student's performance will be assessed at the end of each unit by checking vocabulary chunks related to a particular context.
16 comments on the blog	10	Students will reflect on their learning after each lesson and make a comment including the content they have already learned and questions they may have.

Hands-on Vocabulary Activities

Each of the hands-on Vocabulary activities will have a total of 20 points and will be assessed with a 50% scale.

Rubric to assess dialogue

	Poor	Fair	Good	Excellent
Dialogue quality	Dialogue seems more like characters talking separately instead to each other. No expressions.	Most of the time, the dialogue is written as a conversation. Some lines may come directly from the text.	Dialogue is written as a conversation in which characters listen and respond to each other. No text is copied.	Dialogue is written as a conversation in which characters listen and respond to each other. All text is original, not copied.

Sentences	Poor Many incomplete or incorrect sentences.	Fair Some sentences are incomplete or incorrect.	Good Most sentences are complete.	Excellent Written in complete sentences with adjectives and interesting language.
Vocabulary	Poor Almost no appropriate vocabulary related to the mining processing plant..	Fair Uses simple vocabulary—nothing new.	Good Show some use of appropriate language. A few new vocabulary words related to mining processing plant.	Excellent Shows use of vocabulary related to mining processing plant.

SAMPLE LESSONS

The following sample lessons are part of a mining mechanics' booklet with activities that have been designed for a flipped classroom course.

Each of the sample lessons presented are addressed to the students' needs; thus, each of these activities is designed for people who work in the mining industry.

Furthermore, activities are complemented by videos sent to the students' phones and uploaded to a blog (englishforminers.wordpress.com) where they can share ideas with the rest of the workers.

Once a week, students have a face-to-face lesson where they can discuss about the video content and post a comment about it.

The sample lessons to be found are:

1. Unit 1: Lesson 1
2. Unit 2: Lesson 2
3. Unit 3: Lesson 3
4. Unit 4: Lesson 1
5. Unit 5: Lesson 1

Unit 1: Processing Plants

VOCABULARY OF THE UNIT

Extraction

Mine
Stacker

Crushing plant

Jaw crusher
Belt conveyor

Grinding plant

SAG mill
Ball mill
Hydro-cyclones
Cone crusher

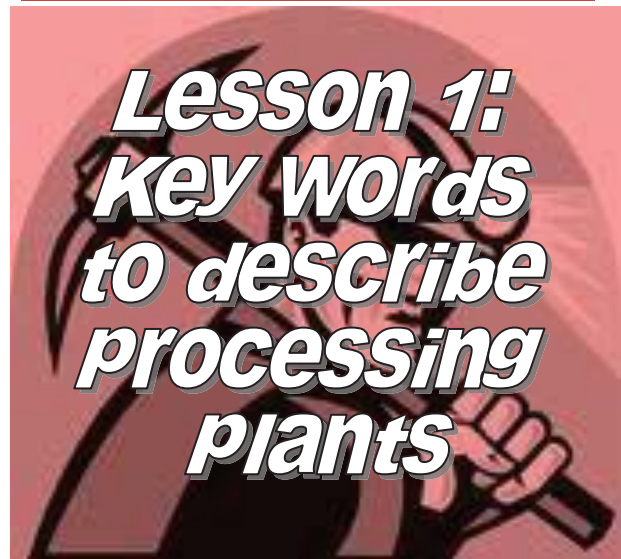
Flotation plant

Primary flotation cells
Flash unit cell
First cleaner
Second cleaner
Stirred tank
Tailing flotation thickening
Vertical mill (Regrinding)

Concentration

Tailing thickener
Concentrate thickener
Pipeline

In this unit, students will be able to recognize words and vocabulary chunks to familiarize with the general scenario (mining processing plant) where students work.



OBJECTIVES:

- to select vocabulary items that describe processing plants by matching pictures to the words



In this lesson you will do four different activities:

- Act. 1 Checking video 1 "Processing plants" sent to your cell phones.
- Act.2 Getting to know the machinery.
- Act.3 Knowing the process.
- Act. 4 Describing the process.

Activity 7

1. Look at the pictures and fill the blanks with a word from the box.

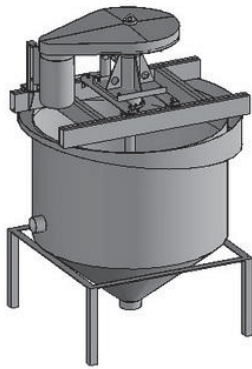
Vertical mill	cone crusher	SAG mill
ball mill	flotation cell	pipeline



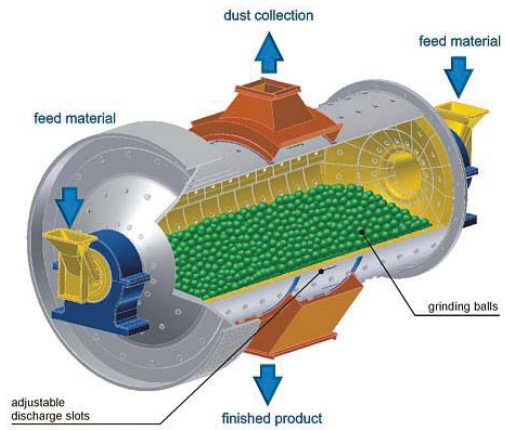
a _____



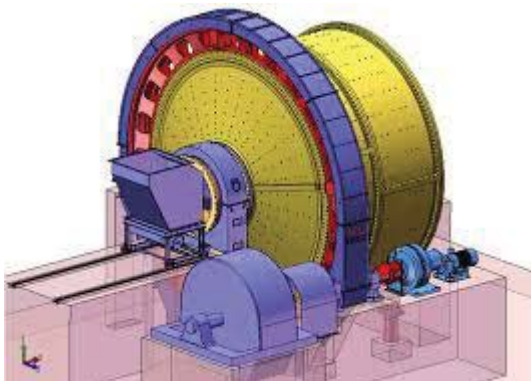
b _____



c _____



d _____



e _____



f _____

Activity 2

1. Look at the image “Mining Industry Processes” and then complete CHART 1

“Mining Industry Processes” Image

- Extraction
- Crushing
- Grinding
- Flotation
- Concentration

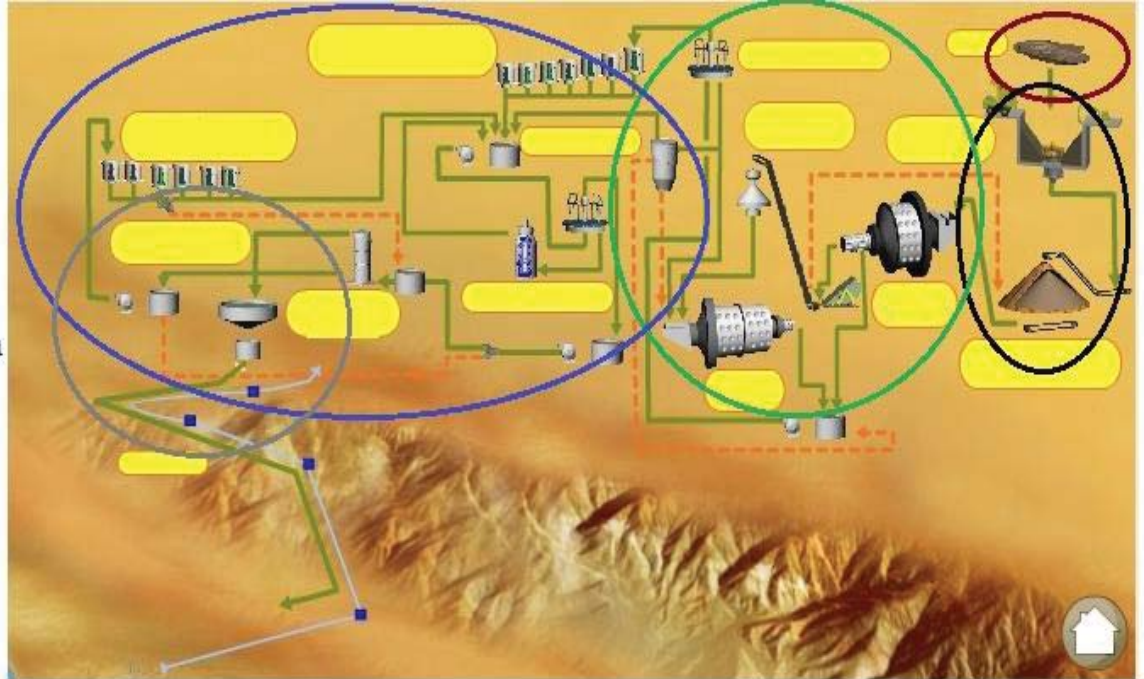


CHART 1

Process	Type of Machinery	Action
Extraction	Stacker	Extract
Crushing	Jaw crusher	Move
Grinding	Ball mill	
Flotation	Vertical mill First cleaner	Separate (the minerals from gangue)
Concentration	Concentrate thickener	Pump

Example: In the extraction process, the miners extract the ore from the mine.

Activity 3

1. Watch video “Mining Industry Processes”. While listening, read the words from chart 1 and repeat the words.



2. In pairs describe one process. Use the following prompts.

- In the _____ process, the miners extract the _____ from the _____.
- In the extraction process, the miners use the _____ and _____ to stack the coarse _____.
- In the _____ process, the miners use the jaw crusher to _____ the ore.
- In the crushing process, the miners use the _____ to move the material.
- In the _____ process, the miners use the _____ and _____ mill, Hydro-cyclones and _____ to grind the material.
- In the concentration process, the miners use the _____ to accumulate the material.
- In the flotation process, the miners use thickener to _____ the material.

No te olvides de responder estas preguntas en el Blog “English for Miners”.



Not so fast!!!!

¿Qué he aprendido en esta unidad?

¿Qué necesito repasar?

Unit 2: Machinery in Processing Plants

VOCABULARY OF THE UNIT

shell segment
 feed head segment
 feed trunnion
 discharge head segment
 discharge trunnion
 shell liners
 feed head liners
 discharge head liner
 feed trunnion liner
 discharge trunnion liner
 feed chute
 feed chute liners
 sump tank
 feed chute liner
 main bearing
 poles

Unit description

In this unit, students will be able to recognize different mill parts, select vocabulary and use it in commands in the SAG and Ball mill assembly processes.



Objectives:

- To select vocabulary used in mill assembly process to use it in commands.



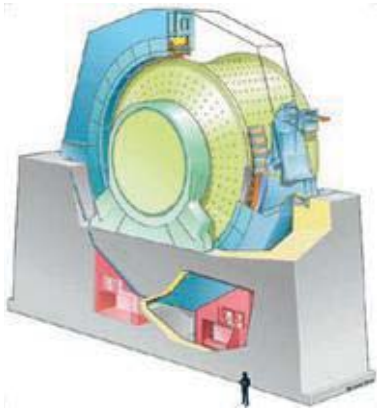
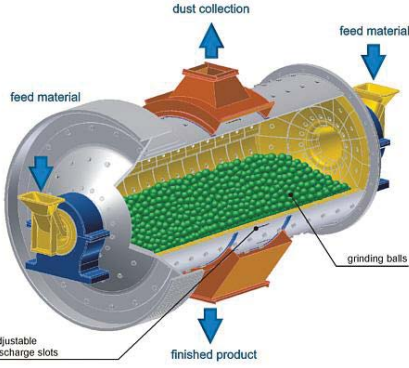
In this lesson you will do five different activities:

- Act. 1 Checking video 3 "Machinery in processing plants" sent to your cell phones.
- Act.2 Recognizing machinery.
- Act.3 Differentiating machinery.
- Act. 4 Selecting vocabulary.
- Act. 5 Assembling a mill.

Activity 1

Recycling vocabulary

1. Match the mill on column A with its corresponding photo on column B.

Column A	Column B
	<p data-bbox="880 758 987 804">BALL</p>
	<p data-bbox="880 1226 971 1272">SAG</p>

Activity 2

Making compounds.

1. Match the words from the left with words from the right to make compounds.

FEED

DISCHARGE

SHELL

SUMP

MAIN

Segment

Head segment (X2)

Trunnion (X2)

Liner

Head liner (X2)

Trunnion liner (X2)

Chute

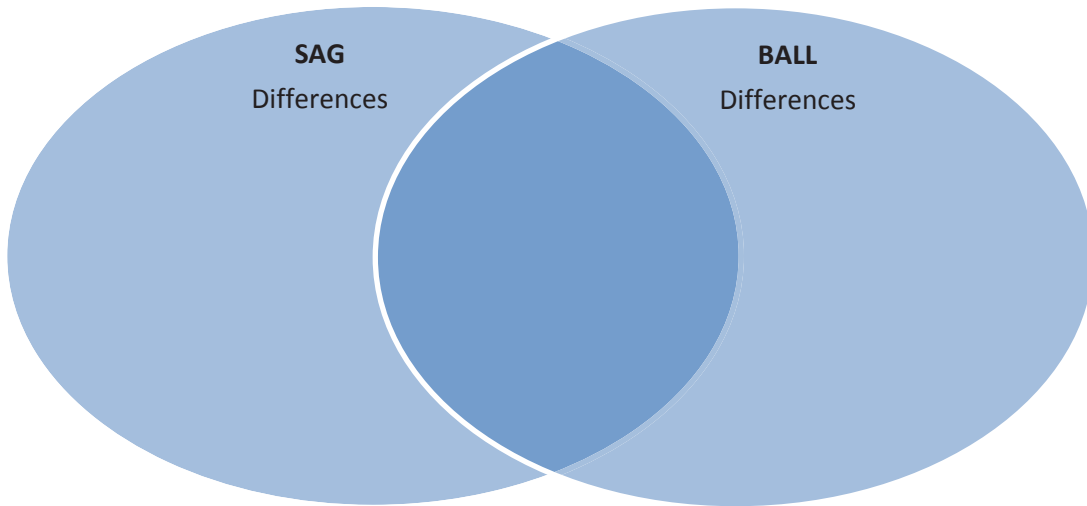
Chute liner (X2)

Tank

Bearing

Activity 3

1. Show what you remember from the video. Complete the diagram with differences and similarities between the mills, regarding to their functions and parts.



Activity 4

Selecting vocabulary



1. Watch the video in class and fill in the blanks with the corresponding verb from the box to complete the commands.

install (X2) secure, rig, lift and move, set (X2)
--

- 1) Set the first shell section into the jacking cradle.
- 2) _____ the jacking cradle assembly to support the lower shell section(s).
- 3) _____ the brake soleplates and main bearing base.
- 4) _____ the first and second bottom sections of the shell and set them next to each other.
- 5) _____ the main bearing soleplates.
- 6) _____ the motor poles and motor stator.

2. Now, watch the video again and order the sentences to complete the SAG mill assembling process

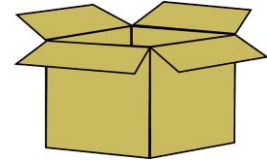
-
- ___ Install the motor poles and motor stator.
 - ___ Install the brake soleplates and main bearing base.
 - ___ Install, set, and secure the jacking cradle assembly to support the lower shell section(s).
 - ___ Rig, lift, and move the first and second bottom sections of the shell and set them next to each other.
 - ___ Set the first shell section into the jacking cradle.
 - ___ Install the trunnions to the feed and discharge ends of the mill.
 - ___ Install the cylinder liners, trunnion liners, and the discharge grate assembly.
 - ___ Install the liners in the feed chute and truck assembly.
 - ___ Set the main bearing soleplates.
-

Read the sentences with a partner and pay attention to the pronunciation of the words

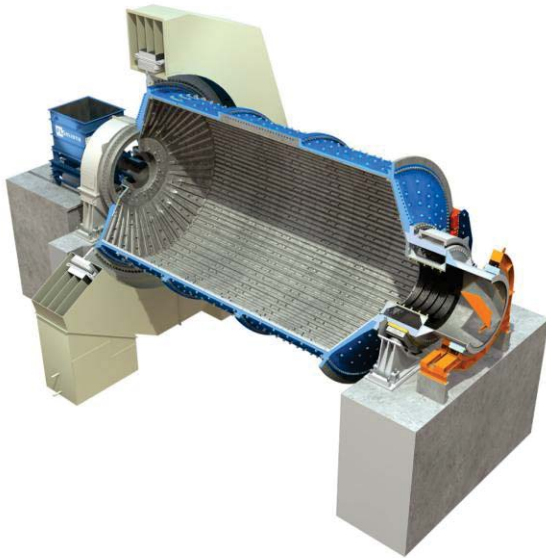


Activity 5

1. Get in groups of three. As a group, you will assemble a scale model BALL mill. The teacher will give you the materials (recycled bottles and cardboard) Explain the assembling process in front of the class.



Take a look at the Ball mill model.



Unit 3: Assembling instructions

VOCABULARY OF THE UNIT

nouns

shell segment
 head segment
 trunnion
 liners
 trunnion liner
 chute
 tank
 chute liner
 main bearing
 poles

verbs

set
 level
 install
 secure
 set
 verify
 rig
 lift
 move
 clean

Unit description

In this unit, students will be able to identify and paraphrase vocabulary taken from blueprints and manuals to understand assembling instructions



OBJECTIVES:

To paraphrase and select information from blueprints to complete a blank manual.



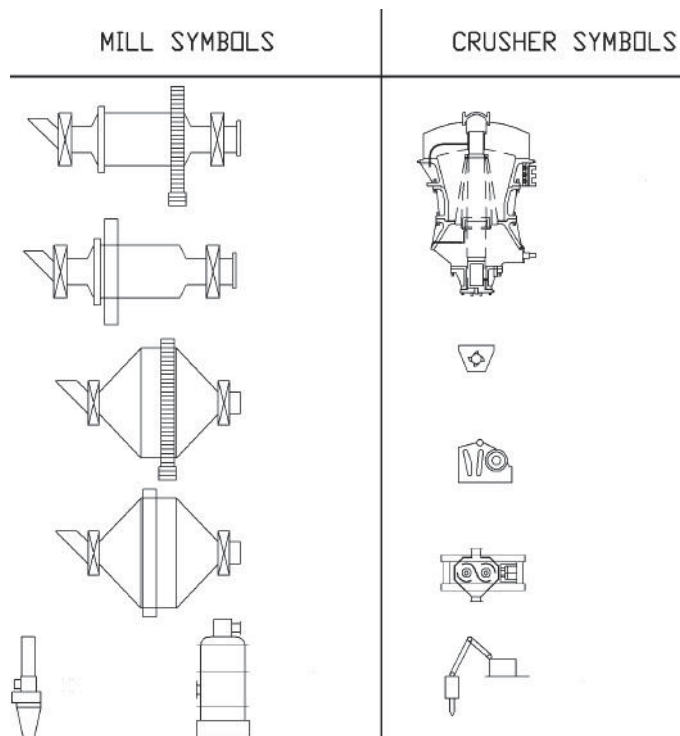
In this lesson you will do four different activities:

- Act. 1 Checking video 1 "Processing plants" sent to your cell phones
- Act.2 Recognizing machinery
- Act. 3 Flanges need to be checked
- Act. 4 Finding the missing mill part



Activity 7

1. Recognize the symbols. Where do you find them?



2. Fill in the blanks with the words from the box.

Ball mill (gear-driven)	sag mill (gear-driven)	micromill	ball mill (gearless)
SAG mill (gearless)	Raymon type mill	gyratory crusher	rock breaker
Hydraulic rock crusher	lump breaker	jaw crusher	

3. Now, get in pairs and look at the blueprint your teacher is giving you. Name the symbols you find.

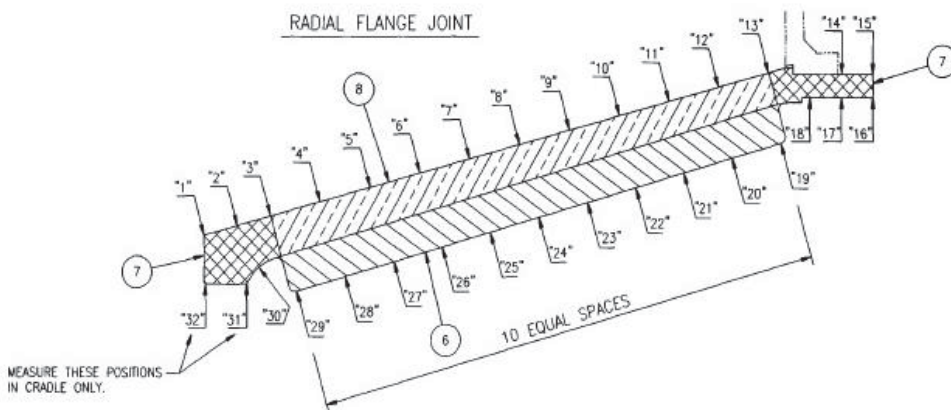


Activity 2

1. Radial flanges need to be checked.

The shells have been assembled, but there is a problem with the joints; there is too much space between them.

Take a look at the blueprint and the acceptance/rejection criteria. Decide what to do in a situation like this.



ACCEPTANCE / REJECTION CRITERIA AS FOLLOWS:

- ZONE 8 A 0.05 FEELER GAUGE SHALL NOT ENTER A FLANGE JOINT TO A DEPTH IN EXCESS OF 200 MM IN ZONE AS SHOWN.
- ZONE 7 A 0.15 FEELER GAUGE SHALL NOT ENTER A FLANGE JOINT TO A DEPTH IN EXCESS OF 75 MM IN ZONES AS SHOWN.
- ZONE 6 A 0.05 FEELER GAUGE SHALL NOT ENTER A FLANGE JOINT IN EXCESS OF 30 MM IN ZONE AS SHOWN.

Do not forget! that all shell flanges must be tighten and completely closed before the circumferential head to shell flange bolts are tighten.

2. Get in pairs and compare your solutions. Make a dialogue, solving the problem.

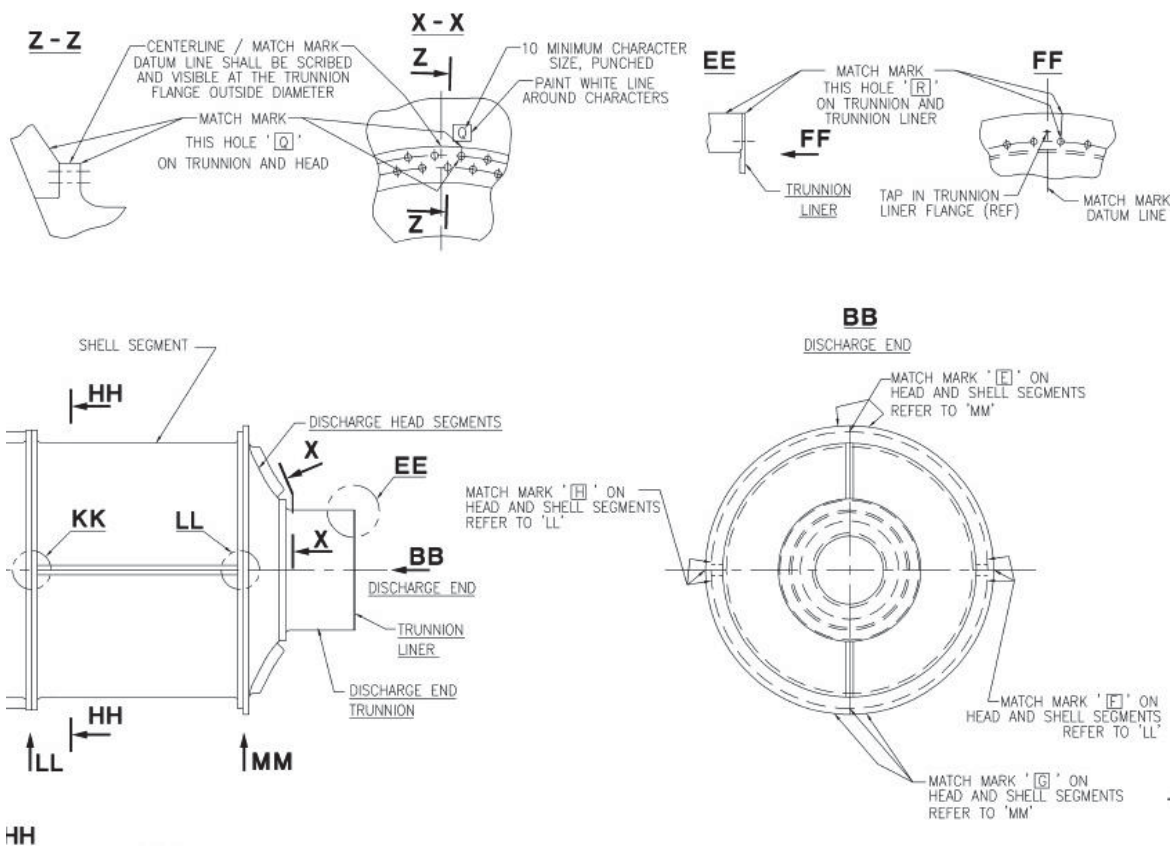
Use the following expressions

Take a look at the acceptance/rejection criteria.
 There is a problem with flange joint 6.
 Flange 7 needs to be tightened.
 Flange 8 is not tightened enough.
 Flange joint 6 is not closed.
 I think

Activity 3

- The teacher will give you a mill blueprint section (A, B or C). Find the mill missing sections. As a group, label each joint mill part by looking at the complete blueprint. Assemble the mill and explain the process to the class.

A



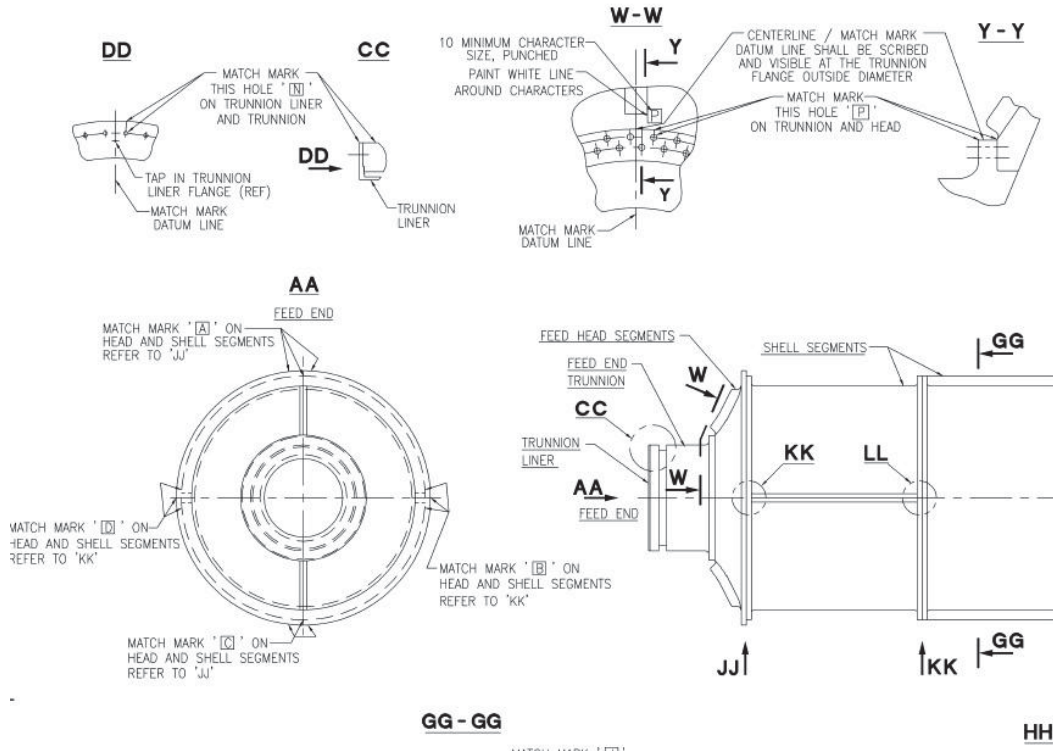
HH

Use the following expressions

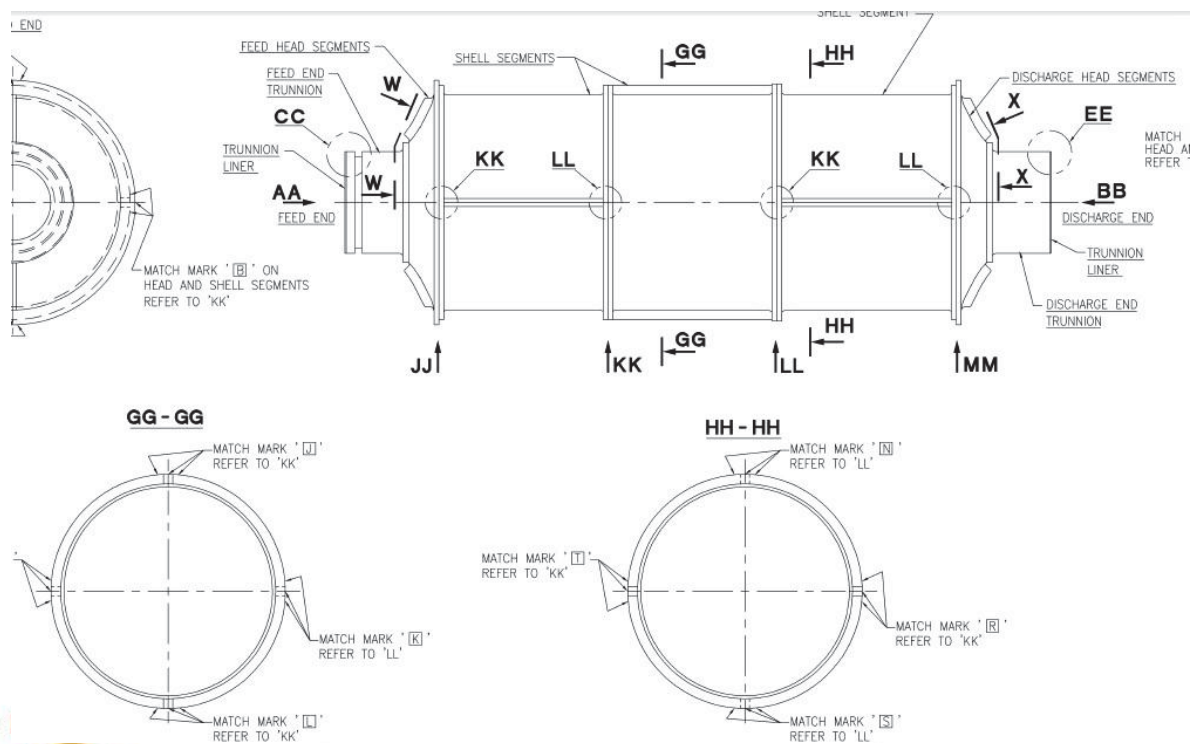
To assemble the _____
 First you need to _____
 Then _____.
 After that _____
 And don't forget to _____



B



C



Remember vocabulary covered in unit 2

Unit 4: Safety in processing plants.

Vocabulary of the unit

Equipment

Nouns

helmet
harness
equipment
gloves
ear protectors
safety glasses
safety boots
ID card
clothing
bolts

Verbs

wear
watch
show
lock
fasten

Adjectives

moving
protective

Unit description

In this unit, students will be able to identify security warnings and compute in simple words.



OBJECTIVES

To recall security warnings and relate them to commands.



In this lesson you will do different activities:
Act. 1 Checking video 17 "Safety in processing plants" sent to your cell phones.
Act. 2 Drawing safety
Act. 3 Giving instructions.
Act. 4 Playing safety.

Activity 7

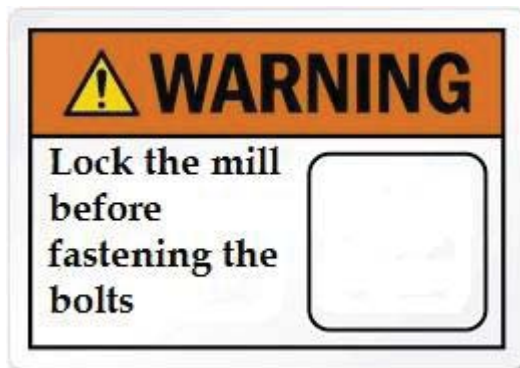
- I. Draw the warning signs in the small box next to the sentences.



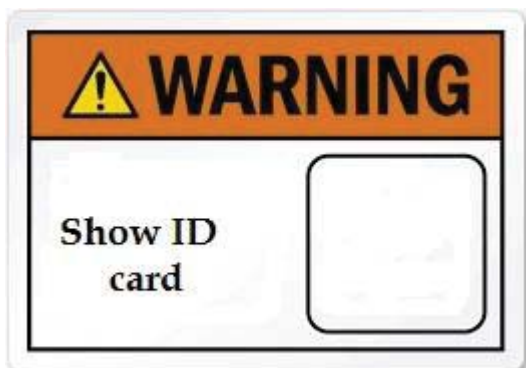
A



B



C



D



E

Activity ↗

I. Read the situation and give instructions to your workers. Check the example below.

Eg-

Situation: I am going to fasten the SAG bolts.

Command: Do not forget to lock the mill.



1) **Situation:** I am going to get some tools from across the road.

Command: Do not forget to _____

2) **Situation:** I need to unpack the mill motor.

Command: Be careful. Those boxes have lots of nails. _____

3) **Situation:** the mill is rotating and I need to work near there.

Command: No problem! _____

4) **Situation:** I need to weld these two pipes.

Command: Do not forget to _____



You can check the video "Safety in processing plants" on the "miners' blog", to check pronunciation.

Activity 3

Game time

I. Work in pairs.

You will receive a set of 20 miner's cards.

Put the cards facing down and choose three.

Make a small conversation between a supervisor and a mechanic.

Using the cards, the mechanic think of the situation and the supervisor gives the command.

Choose another set of cards and change roles.



No te olvides de responder estas preguntas en el Blog "English for Miners".



Not so fast!!!!

¿Qué he aprendido?
¿Qué necesito repasar?

Unit 5: Interaction with supervisors

Vocabulary of the unit

- appropriate vocabulary to talk to a supervisor
- common questions
- common problems

In this unit, students will be able to recall information related to the assembling process and use it in conversation explain assembling processes to foreign supervisor.



Objectives:

Practice vocabulary chunks to be used in a conversation in a mill assembling process context.



In this lesson you will do four different activities:

- Act. 1 Checking video 1 "Processing plants" sent to your cell phones.
- Act. 2 Recognizing appropriate vocabulary.
- Act. 3 Questions!
- Act. 4 act it out!
- Act. 5 Talking to a supervisor.



Activity 1

Do's and don't's

Discuss with a partner if these comments are appropriate for a conversation between a worker and a supervisor.

Add more information if you can.

- a) *If it is a woman supervisor, kiss her on the cheek.*
- b) *Tell him/her gringo/a.*
- c) *Say hello*
- d) *Introduce yourself*
- e) *Handshake*
- f) *Stay quite.*
- g) *Swear*



Activity 2

1. Write the most common questions a supervisor asks a worker, related to the assembling processes.

Example :

Were the shells assembled in the correct order?

2. Get together with a partner and have a conversation and answer the questions.



Activity 3

1. Before you listen, what are the workers doing?



3. Listen to a conversation and take notes. Were you right about your predictions in activity one?

Transcript

Supervisor: Tell me... What did you do?

Mechanic: We assembled two shells together: Section A on top and Section B at the bottom as you told us and what we read on the blue print.

Supervisor: Perfect! Assemble the next two shells now.

3. Read the transcript of the conversation. Check your notes in exercise 2.

4. Learn the conversation and act it out!

Read the sentences with a partner and pay attention to the pronunciation of the words



Activity 4

Role play

Get in pairs.

Decide who is the supervisor and the mechanic.

Choose a miner- problem card and use it to create a new conversation.

Use the conversation in activity 3 as an example.



The longitudinal flanges are not tighten

Grinding balls develop high internal stresses and may explode.

Internal braces need to be removed before the shells are assembled.

Never enter an enclosure that is an explosion hazard.

We do not pay attention to the match marks on the trunnion and the head.

The bearings were not protected after their installation.

Choose one of these instructions and use it as part of the conversation

1. Ensure that the confined space has adequate natural ventilation.
2. Wait until any overstressed balls explode or cover the mill charge with a protective blanket.
3. Verify closure of the longitudinal flanges with a feeler gauge before the bolts are tightened.
4. Do not remove internal braces until after the shell heads and trunnions have been assembled and the mill is supported on the main bearing.
5. If the bearings are installed in their housing, cover and protect them from damage while installing the trunnion.
6. Verify match marks for proper angular position of trunnion with respect to the head.

Useful expressions

Tell me, what's the problem?

Is there a problem?

What is going on?

O.K you can fix that_____

Why don't you_____?

Did you try_____?

We could_____

I think the best option is_____

You should_____

APPENDIXES

Appendix A: Questionnaire

Estimado,

Este cuestionario tiene como objetivo descubrir si capataces y supervisores están dispuestos a aprender inglés con la ayuda de nuevas tecnologías en su tiempo libre. Por favor responda declaraciones 1-12, escogiendo una de las opciones presentadas en la escala de apreciación. Agregue cualquier comentario necesario al final de la página con toda libertad. Gracias por su ayuda.

Mr. Miguel Zamora

ITEM	1	2	3	4	5
1. Hablo inglés perfectamente					
2. No tengo problemas al entender Inglés hablado.					
3. Inglés es importante para mi trabajo.					
4. Siempre estoy en contacto con trabajadores extranjeros.					
5. Aprender inglés se hace fácil adaptándolo a mis necesidades laborales.					
6. Manejo vocabulario en ingles relacionado a mi trabajo.					
7. Mis turnos de trabajo son agotadores.					
8. No tengo mucho tiempo para tomar clases de inglés en institutos					
9. Estoy interesado en aprender por mí mismo.					
10. Clases presenciales deberían ser una vez por semana					
11. Un celular es una herramienta que yo usaría para aprender ingles					
12. Ver videos podrían complementar mis clases presenciales.					

Comentarios:

Appendix B: Needs analysis results

The questionnaire was completed by eleven mechanics and supervisors from the mining industry and the results are presented in the chart previously shown. The participants work for different mining enterprises, among them *Esperanza*, *Pelambres*, etc. The results were collected from April 20th to April 30th 2016. The Questionnaire was presented in Spanish to avoid misunderstandings and to address to workers who do not know the English language.

Figure 1

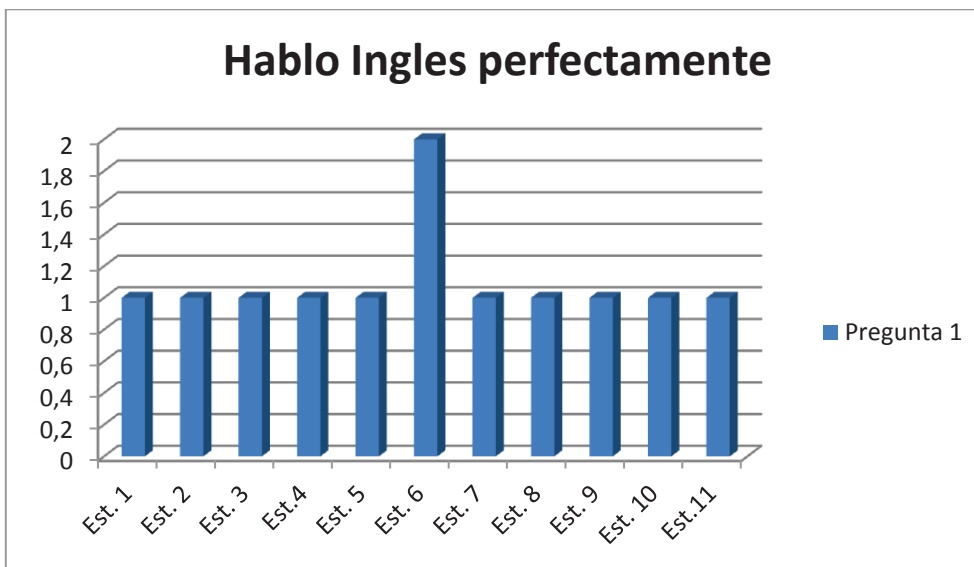


Figure 1 shows that the 91% of the students do not speak English and only a 9% know something which offer a real opportunity for the development of this workshop.

Figure number 2

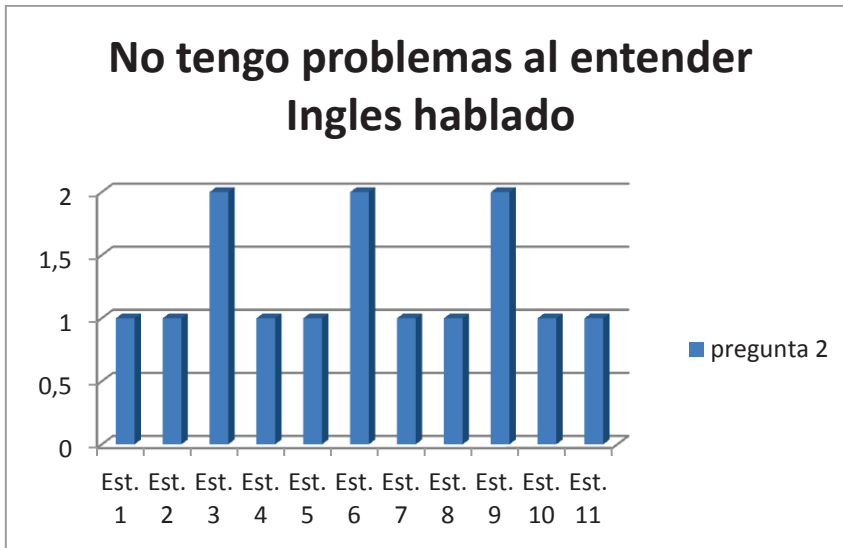


Figure 2 shows that 72% of the students have problems understanding spoken English, while the 28% think they can understand something as they work with vocabulary related to their area. The result shows that the workshop is good opportunity for mining industry mechanic to improve communication with foreign supervisors.

Figure 3

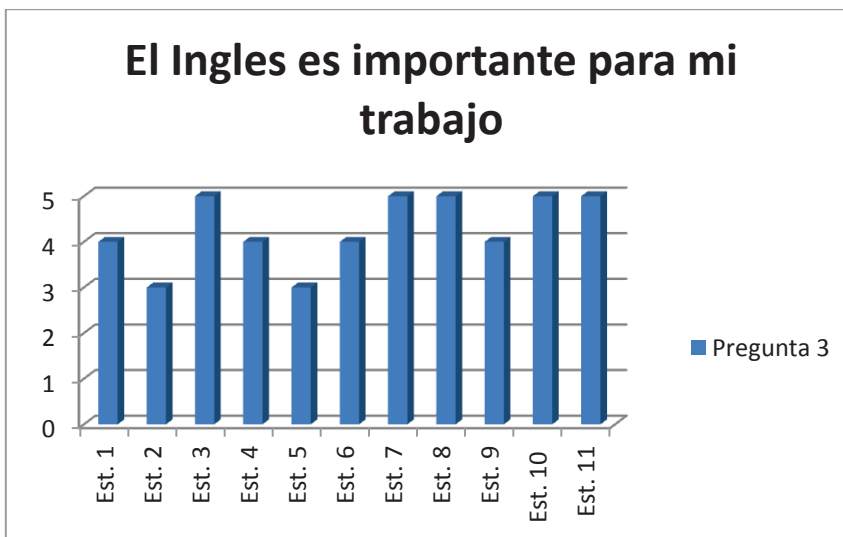


Figure 3 shows that 82% (9) of the students think English is very important for their jobs. 18% (2) are not clear about this statement, which reaffirm the idea of developing the course.

Figure 4

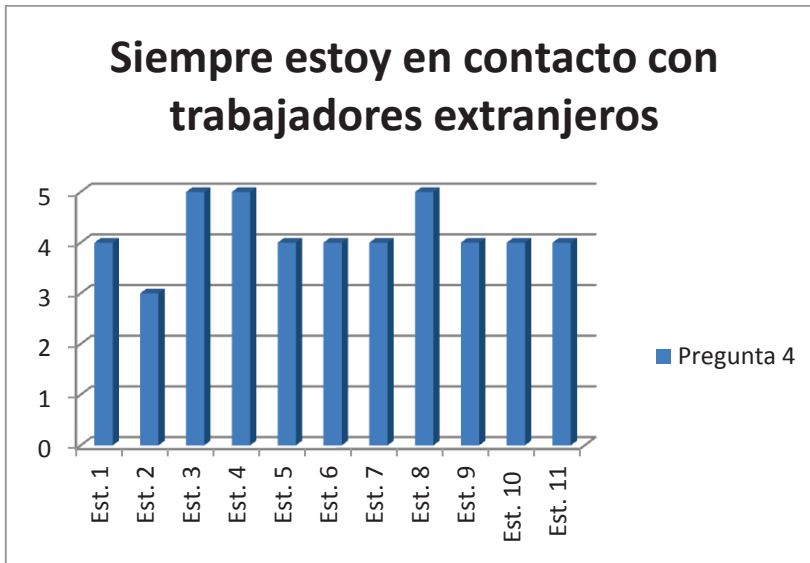


Figure 4 shows that 91% of the students are always in contact with foreign workers and only the 9% does not know with certainty about the statement, which confirms that 10 out of 11 mining workers follow instructions from foreign supervisors.

Figure 5



Figure 5 shows that 91% of the workers think that adapting English to their work needs, they will learn easier than with other methods. Only the 9% are not sure if such adaptation will affect their learning process. In this sense, an ESP methodology would fit students' needs, leading to a practical use of the language.

Figure 6

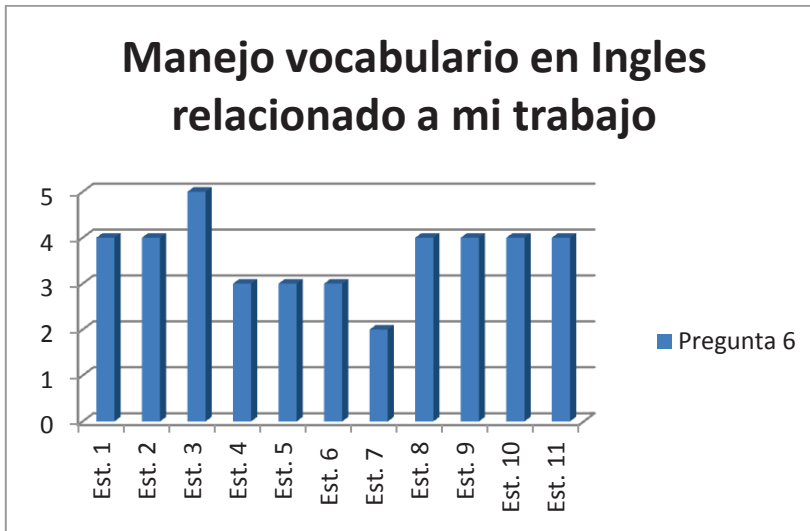


Figure number 6 shows that 64% (7) of the students think they have some knowledge about vocabulary in English related to their jobs. 27% (4) of the students think they do not know with certainty if they master English vocabulary related to their jobs. 9% (1) of the students believe they do not have knowledge about English vocabulary, although, most participants report having vocabulary knowledge related to processes, tools and equipments.

Figure number 7

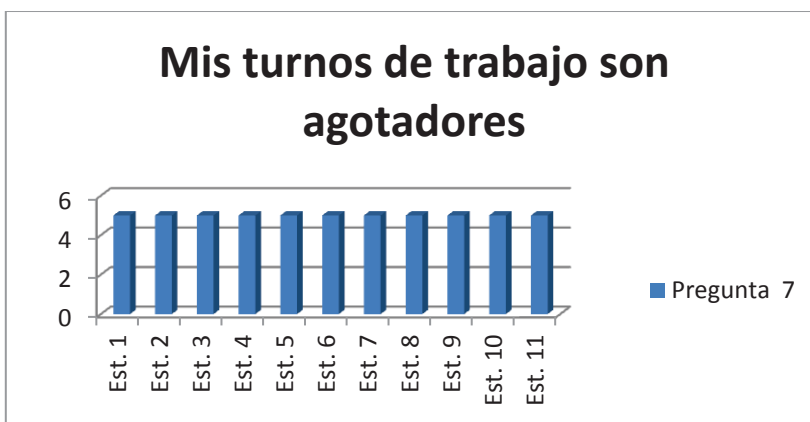


Figure 7 shows that 100% of the students agree that their work shifts are very exhausting, which suggests the need to use a methodology that do not pose greater time demand. In this sense, a flipped methodology would help students learn English, adapting it to their time schedules.

Figure 8

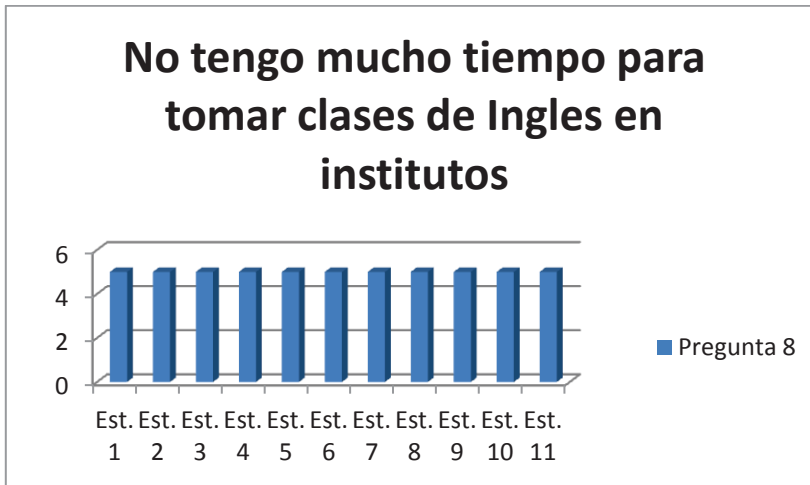


Figure 8 shows that 100% of the students do not have time enough to learn English at an institute, which reaffirms the idea of a flipped methodology that adapts itself to the student's availability.

Figure 9

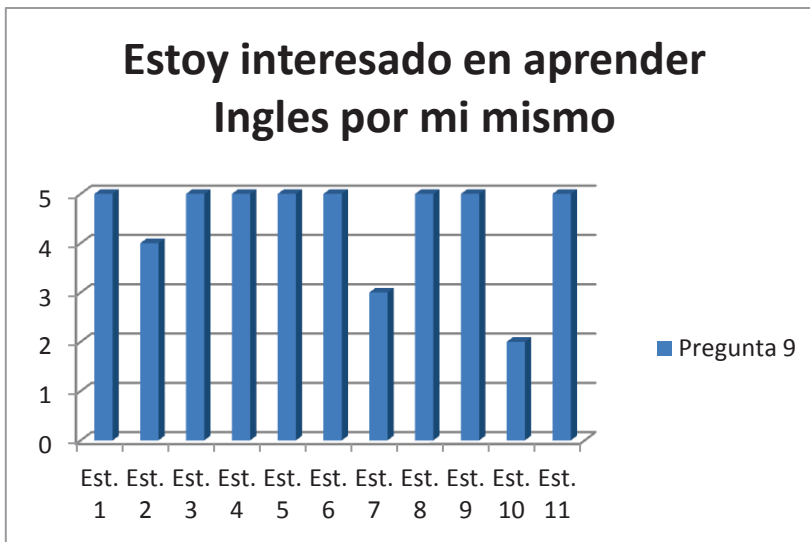


Figure 9 shows that 82% of the students are willing to learn English by themselves. On the other hand, only the 18% of the workers do not know if they want to learn English by themselves.

Figure 10

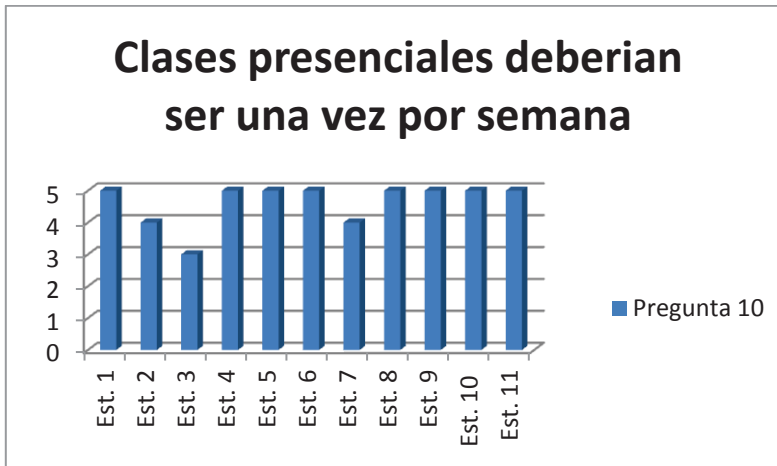


Figure 10 shows that 91% of the workers believe it is necessary to have face-to-face classes once a week. Only 9% does not know about attending classes. Flipped methodology not only will allow student to put what they will have learnt into practice, but also to solve problems in face-to-face lessons.

Figure 11

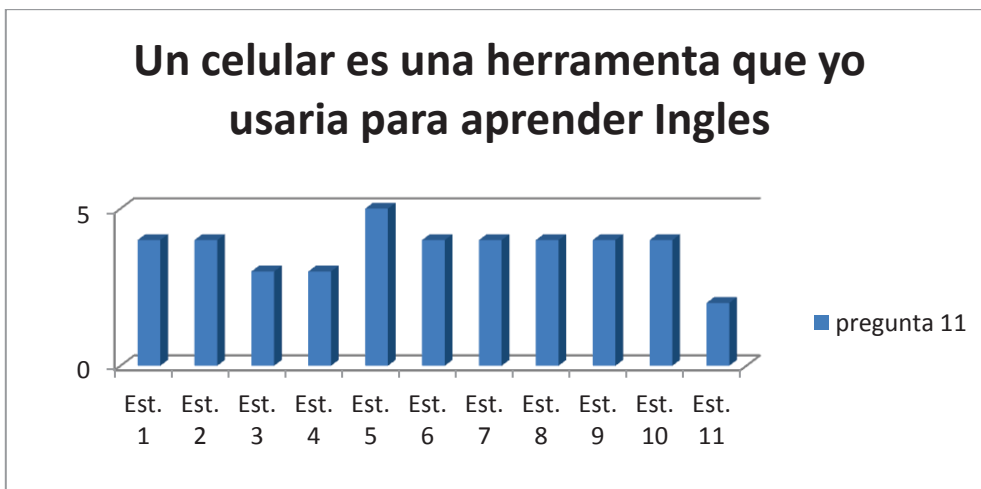


Figure 11 shows that 81% of the students think that they would use cell phones as a learning tool. However, the other 19% do not think that a cell phone is an appropriate tool to learn another language.

Figure 12



Figure 12 shows that 91% of the workers agree that watching videos could help them learn English. The other 9% do not know if videos could complement a lesson, which confirms the use of flipped methodologies where videos that can be watched on their free time can be used as the main pedagogical tool.

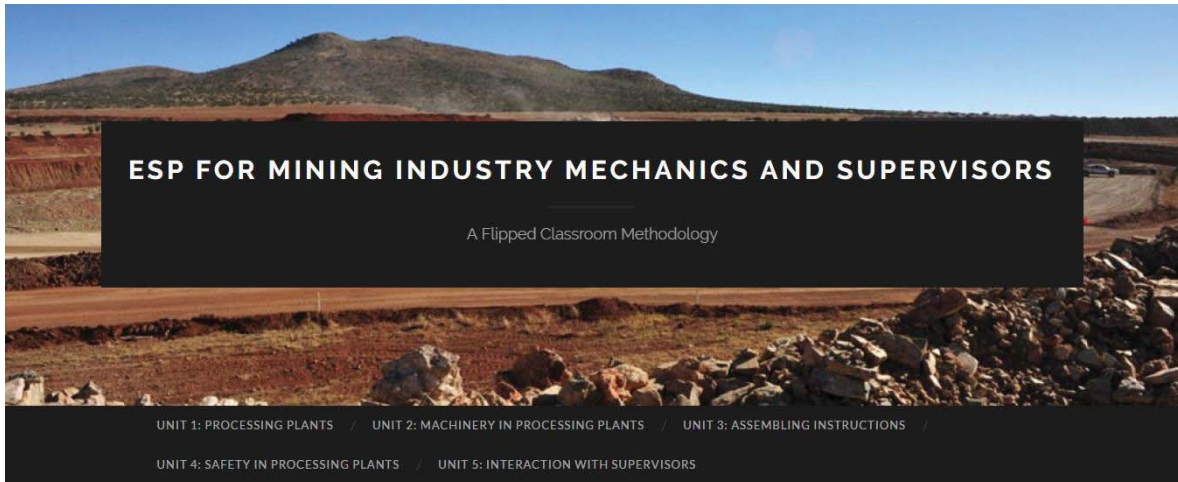
Conclusion

According to the 11 mining industry questionnaire answers, the results show that people are willing to learn English through adapting material to their own needs, especially at work. Although people do not have time enough to learn another language at an institute due to exhausting work shifts, they are willing to learn English by themselves with the use of a cell phone and videos.

This result shows that with the lack of time and the use of cell phones as a learning tool, the “flipped classroom” methodology is appropriate to teach mining industry workers at a basic level.

Appendix C: Class Blog

URL: <http://englishforminers.wordpress.com>



Appendix D: CD

REFERENCES

- Adam Butt. (2014). Student Views On The Use Of A Flipped Classroom Approach: Evidence From Australia. *Business Education & Accreditation*, 6(1), 43.
- Amchamchilecl. (2008). AmCham Chile. Retrieved 29 April, 2016, from [http://www.amchamchile.cl/UserFiles/File/Mining Industry.pdf](http://www.amchamchile.cl/UserFiles/File/Mining%20Industry.pdf)
- Bechtel. (2016). Los Pelambres Copper Mine, Chile. Retrieved from <http://www.bechtel.com/projects/los-pelambres-copper-mine/>
- Bergmann & Derrick. (2012). To Flip or Not to Flip?. In Iste (Ed), *Learning & Leading with Technology* (pp. 7). US & Canada: ISTE.
- Capitalonline. (2016). Cuanto tiempo pasan los Chilenos en Internet a través del Smartphone. Retrieved from <http://www.capital.cl/negocios/2016/02/10/060244-cuanto-tiempo-pasan-los-chilenos-en-internet-a-traves-del-smartphone>
- Conklin and Schmitt. (2012). *The Processing of Formulaic Language*. (1st ed.). UK: Cambridge University Press.
- Dakun. (2002). *Vocabulary Acquisition: Implicit learning and explicit teaching* (2nd ed.) Singapore: National Institute of Education
- Dudley-Evans and St John. (1998). *Development in English for Specific Purposes*. (1st ed.). United kingdom: Cambridge university press.
- Enlaces (2016). Enlaces. Retrieved from <http://www.enlaces.cl/sobre-enlaces/historia/>

- Ets. (2007). Copper-Mining Company Certifies the English Fluency Supervisors and Managers. *TOEIC® Test Success Story*, 1(1), 2.
- Hutchinson, T., & Waters, A. (1987). *English for Specific Purposes: A learning-centered approach*. Cambridge: Cambridge University Press.
- Inacap (2016). Inacapcl. Retrieved from <http://www.inacap.cl/tportalvp/mecanica/contenido/carreras/ingenieria-mecanica-en-mantenimiento-industrial-cod-n3-n30-2>
- Inguccl. (2013). *Ingeniería UC*. Retrieved from <http://www.ing.uc.cl/the-flipped-classroom-cambio-de-direccionalidad/>
- Robinson, P. (1991). *ESP today: A practitioner's guide*. New York: Prentice Hall.
- Schmitt, N., & Carter, R. (2004). Formulaic sequences in action: An introduction. In N. Schmitt (Ed.), *Formulaic sequences* (pp. 1–22). Amsterdam, the Netherlands: John Benjamins.
- Tesol (2012). *Vocabulary and its Important in Language Learning*. Retrieved from http://www.tesol.org/docs/books/bk_ELTD_Vocabulary_974
- Wray, A. (2002). *Formulaic language and the lexicon*. Cambridge, UK: Cambridge University Press.