Tutellus

Empowering people through Education

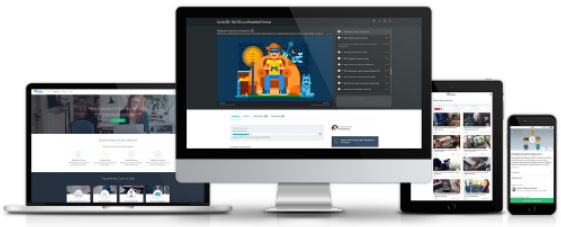
www.tutellus.io

ver 3.25

April 2018

*"**Tutellus.com**, the leading Educational platform in the Spanish speaking world."*

El País, 2016



5 years
Teaching

1 million
Students

2 millions
Transactions

10 billions
Minutes learning

Mission

"Bringing education to the last corner of Earth"

"A living ecosystem since 5 years ago "

Community
+1.000.000 Students

Teachers
+130.000 Videocourses

Affiliates
+10.000 content promoters

Tutors
+20.000 users with high relevance

Countries
+160 on 5 continents

Universities
+80 agreements

Job finders
+50.000.000 monthly users

Companies
+50 corporative channels

Tutellus

*"**Tutellus.io**, the first platform that pays you for learning"*

Tutellus.io is the evolution of Tutellus.com towards a decentralized and tokenized model

The TUT tokens, the cryptocurrency empowering the user

An ecosystem where all players get benefits: Students, Teachers and Companies. Using the Pool tokens and the Market students and teachers may study for free and earn money through tokens, get Relevance and access to valuable services

Vision

"Reduce the poverty by paying students for learning"

Over 10 million people will be able to make money through 50 millions courses during the next 2 years

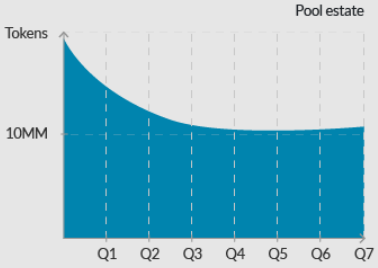
With a governance and tokenomic model sustainable on the long term

STUDENTS

- Earn money while studying
- Learn more and better
- Get rewards through relevance
- Pay with cryptocurrency
- Access through complex markets

TEACHERS

- Instant payments
- Earn money with the best students
- Earn money through relevance
- Earn money through subscription services
- Access to unique promotional services



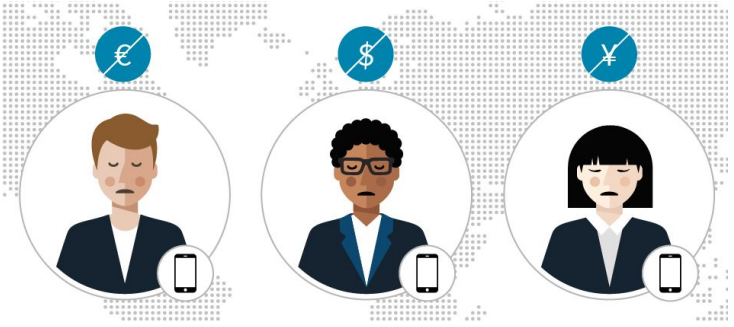
Shall we begin?

INDEX

The Vision

Education, The Pending Asset

Education has hardly improved in the last thousand years, and most importantly: no educational model lets people earn money while they study. On the contrary, they have to invest in their own education hoping to earn that money back in the long term.



There are, as we see it, four main problems in education:

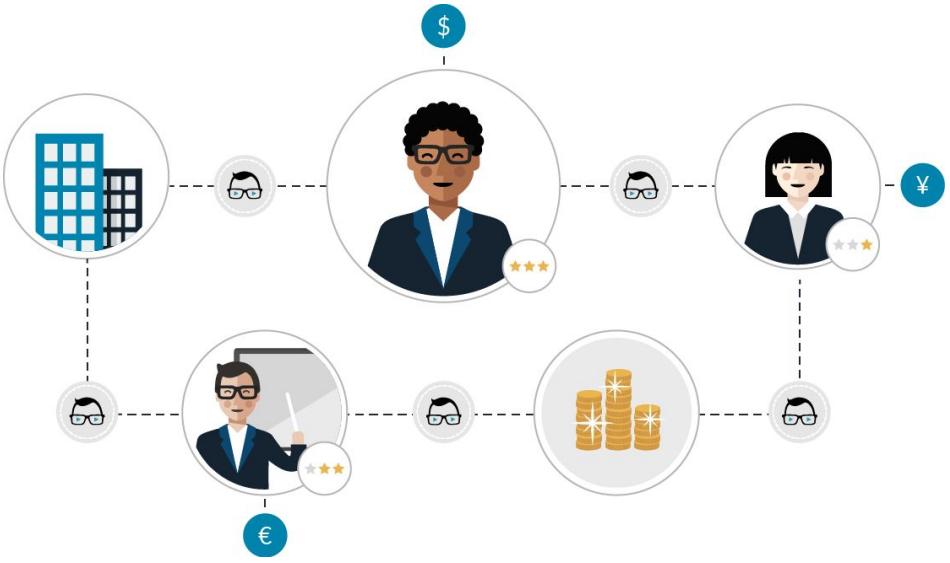
1. People cannot earn **money** studying, they have to spend more instead.
2. Students often lack **motivation**, so they often stop studying.
3. Teachers can't earn money depending on the **value** of the students that they generate, and are not fairly retributed for their efforts.
4. There is a huge gap between **employment** and education, with millions of jobs unfilled.

Tutellus.io: A New Paradigm

Tutellus aims to break the *status quo*, introducing a new paradigm in the student-teacher relationship with *the creation of a new decentralized system to strengthen the commitment of both students and teachers*. Tutellus is the first educational platform that **pays students for learning** (*proof of learning*) and **remunerates the teachers according to their impact in the success of their students** (*proof of teaching*).

Tutellus.io solves the problems we have identified in a very simple way:

1. Students can earn **money** learning, without paying.
2. Students gain the **motivation** to help others to learn.
3. With the success of their students, teachers themselves get more **value** out of teaching.
4. Companies can hire **employees** with a highly efficient matching process.



Tutelus.io generates an ecosystem where both students and teachers earn money depending on the actions and activities they generate in the platform, which also provides all agents (students, teachers and companies) with access to news resources, leads, candidates, and services.

Blockchain as a Tool to Diminish Poverty and to Empower People

Blockchain, most famously known as the technology behind bitcoin and other cryptocurrencies, makes possible the efficient implementation of the new educational paradigm proposed by Tutellus. At the core of the new system is the creation and management of digital assets, or ***tokens***, that will become the foundation of a new reward system for students and teachers.

Our platform will measure the commitment of the students and teachers, as well as the educational value that they provide in the platform, and will provide a measure of **relevance** through an internal STUT token. This system will also include functionalities associated with transactions, governance, and access.

Tutellus contributes three key elements to make this a successful project:

1. A **business model** at work since 2013 with a community of one million users and 130,000 video courses.
2. A **platform** that pays users for their actions and contributions.
3. An **application** of Blockchain technology that answers perfectly the needs of the online educational market.

1. Introduction

In 2016, the online education market was worth USD 165 billion. It is still, however, highly inefficient in addressing the need for education around the world.

While the job market produces one billion contracts every year, over 300 million recent graduates remain unemployed and in search of a job. In Europe alone, the imbalance between job supply and demand is expected to be around 80%, particularly affecting the technology sector. As a result there is a growing perception that educational institutions are out of touch with employers' needs.

On the other hand, the developing countries are home to millions of unemployed people who are gaining access to the Internet through their mobile phones. They can now join education platforms. However these require an investment from the poorest that is rarely affordable.

A new approach is needed to address the key challenges that the market faces, that the current educational model has failed to solve.

2. The Problems

2.1. Poverty and Lack of Job Opportunities

There are millions of trained workers in developing countries who lack job opportunities. They may end up with unstable and poorly paid jobs, or below the poverty line.

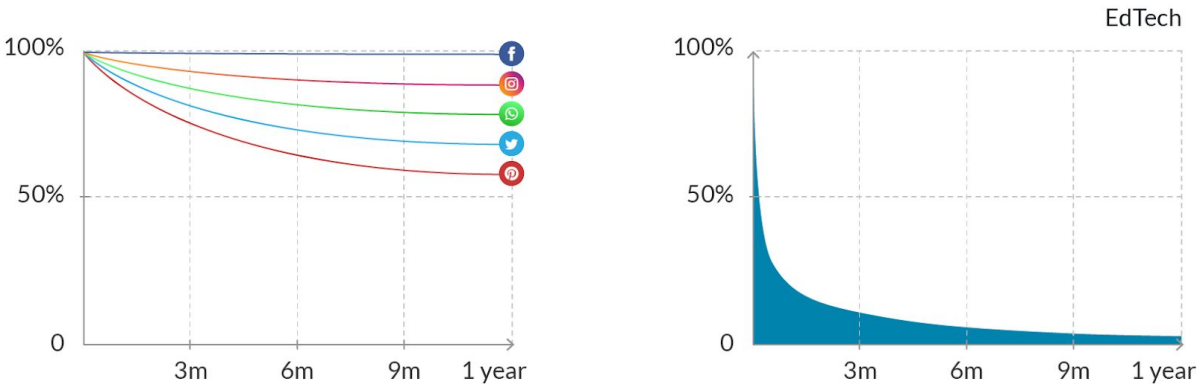
With the high use of mobile phones in some of these countries, close to the level seen in the USA or Europe, people now have access to the Internet, which, combined with Tutellus, can provide them a way out of poverty.

These people will be eager to earn money, learning new skills in the process.

2.2. Low Student Motivation

Learning demands effort and motivation.

All EdTech platforms currently suffer from low levels of conversion and user retention. When comparing user engagement—the frequency a service is used on average—to those of other social platforms (either business or leisure-focused, from social networks to messaging services), we can observe how different the user behavior is. While the main social platforms get a high monthly cohort engagement over 80%, educational platforms measure a dramatically lower engagement around 5-10% in the long term.



User engagement on social media platforms Vs EdTech.

This issue is not particular to a single company nor even to a single business model, but rather a constant, implicit trait affecting the entire sector. Low engagement on any platform means fewer social relationships, and generally lower revenue per user. As a result, the sector as a whole requires a higher marketing spending in order to attract new users and be sustainable

The main reason behind the low level of engagement is the lack of student motivation. Studying, whether online or offline, requires dedication, sacrifice even, and the investment of significant amounts of money, effort and time. Meanwhile, students may be skeptical about whether the courses meet their expectations, either because they are concerned about the quality of their training, or because it might not help them find a job.

2.3. Low Teacher Motivation

Teaching is far from easy. Most of us probably remember our best teachers and the effort they put into their work. *This effort, however, is hardly recognized*. Good teachers are often not better paid than the others, and are rarely acknowledged for the quality of their work. This leads to the demotivation of good teachers, leading all to provide lower-quality teaching, and leaves badly trained students with fewer job opportunities.

For teachers, there is almost no difference between the earnings of a good teacher and those of a bad teacher. *There are still no efficient mechanisms to gauge the effort and dedication of the best teachers*. This lowers teachers' motivation, and directly impacts the quality of the education students receive.

An efficient education system should reward teachers according to the performance of their students, as measured by high grades, high engagement, or job placement.

2.4. Weak Link with the Job Market

Education is also facing the diminishing value of degrees and certifications, which were at the core of the education system until the beginning of the 21st century. The market value of degrees and certifications is lowering in a new system in which people are normally assessed not by their grades, but rather by their work experience, involvement in real projects, and personal job fit. As a result, the job market is dramatically changing in the way it values education overall.

At the same time, there is an immense need for properly trained workers in several sectors, particularly in IT, and employers struggle to find suitable candidates; education is still needed to fill the existing gap between supply and demand, and formal education as it stands now does not respond to the market's needs.

This disconnect creates a vicious circle within which companies become more disengaged from the education sector, widening further the gap between education and the job market.

Clearly, new tools and systems are needed to train and identify the most appropriate candidate for a position.

3. The Solution

3.1. Tutellus.io Objectives

The main objective of Tutellus is to create a new educational model that answers to the challenges of the market: train and identify the most committed students, increase the involvement of the best teachers, and strongly tie an educational community - the student body and teacher faculty - to the job market.

Pulling people out of Poverty by paying and matching them with Jobs

Imagine a platform that help people to leave poverty behind. Tutellus plans to partially fund education for some of its students that are studying for available jobs.

Adding value to the Students

Imagine a platform that rewards the best students for their participation. The logic is simple: the better the training the student gets, the higher the value of the student for both the education community and companies (employers, job placement agencies, other service providers). This higher value of the student body stretches across the education platform to reach employers, and further into society as a whole.

Adding value to the Teachers

Imagine a platform in which teachers are rewarded for the excellence of their students: the more the students become relevant to the education platform and the job market, the more money their teachers will receive. Improving the students' relevance will motivate the teachers, which in turn will significantly improve students' motivation, the quality of the content, and the teachers' commitment to their students.

Adding value to Companies searching for Candidates

Imagine a platform where companies may find the perfect fit for a position or contract. The platform will help students become more relevant to companies by creating a virtuous circle motivating the entire community of teachers and students. Students will be identified as job candidates by companies by their value in any specific learned skill.

> Building upon its large student base (over 1 million students) and teaching material (over 130,000 video courses), Tutellus will become the first decentralized EdTech platform, answering the challenges faced by the education sector by using blockchain technology. Blockchain will allow for the creation of digital assets (or tokens) that will be at the core of the new system of incentives for the Tutellus community.

3.2. The Token System

Such is Tutellus's vision: a novel educational model that creates a new system of incentives by which all users get rewarded directly according to the value they provide to the community.

This model is possible today using blockchain, and particularly NEM technology.

The reward system will be built with digital assets or tokens, the currency that will be at the core of the market. The entire system will operate according to rules implemented as smart contracts, thus ensuring the full digitalization and the autonomous operability of the platform.

The token system will be used for more functionality overtime: as a currency for buying products and services, serving as a measure of relevance[1] in any skill, setting a governance model for the platform, and interacting with other tokens.

The model uses two different tokens: TUT and Smart TUT (aka STUT).

TUT will be used as the platform's currency and to interact with other platforms and currencies.

Smart TUT or STUT, will not be directly tradable in fiat, and will be granted to reward users who contribute educational value to the platform and as a measure of the quality of their participation.

A user may earn STUT in multiple ways, all of them related to learning or helping other users to learn. The number of STUT tokens held by a user provides a measure of the relevance and the importance of this user for the platform. An additional reward system will grant additional benefits for holding high amounts of STUT tokens.

The STUT tokens can be partly traded for TUT tokens or stored in the user's virtual wallet as a measure of Relevance in the platform, which will provide benefits in the long term (such as job matching enabling companies to access to better employees, companies looking for influencers, lead acquisition, etc.). The user cannot buy STUT at any point: it must be earned by doing actions inside the platform.

[1] Relevance is the measure of knowledge and activity in any skill or micro-skill. The more relevance you have, the more you impact over the community and other users. Relevance can be won (learning more) or lost (not updating your knowledge or associated activities).

How will the TUT tokens be used?
The TUT tokens will be in limited supply and be used to access multiple services:

- Course purchases including from countries where it is difficult to use fiat: Venezuela, Cuba, Zimbabwe, etc
- Course discounts available only with a purchase in tokens
- Donation services, only available in tokens
- Teacher services, only available in tokens
- Services to companies, only available in tokens

Both tokens will be distributed among the current students and teachers to generate activity from day one. *Our community of almost 1 million teachers and students will thus be our greatest asset and will play a key role in growing the platform.*

	TUT	**STUT**	**Example**
What does it represent?	Access to products and services	Relevance to the community	A course valued 30 € may be paid in TUT tokens, and has a relevance of 3,000 STUT
Where can I get it?	Inside or outside the platform	Inside the platform only	There are multiple ways to get TUT tokens. STUT can only be earned by studying
What can I use it for?	Transactions, donation, governance	Show relevance, access to benefits, job matching	TUT tokens act as a currency inside the platform. STUT tokens show relevance and can give you additional income.
What is the value of the token?	Fluctuates	1 € = 100 STUT	The price of the TUT depends on the laws of supply and demand. The price of the STUT is always 0,01 EUR

The TUT token is a full tradable token that the user may use to, among other things:

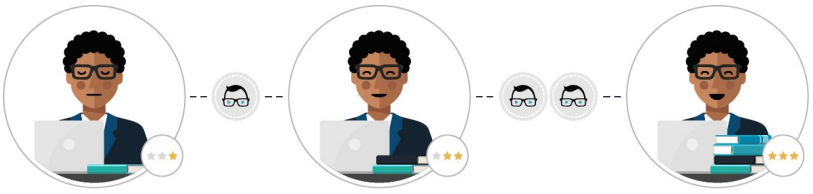
- Buy any product in the platform
- Buy services, such as promotion and marketing for teachers, access to the students' profiles, and other third-party services
- Access scholarship programs funded through third-party donations
- Influence governance decisions associated to relevance: approval of courses, career design, teachers, tutors and master management, etc.
- Transfer money to other people, inside or outside the platform

The TUT tokens will be available to students, teachers and companies in multiple ways:

- By buying them during the ICO or through the bounty program
- Through the scholarships granted by Tutellus that reward the best students
- By getting a share of the money paid by third parties (e.g. income generated by employers paying for identifying the best students)
- Through the loyalty program (see section 3.8)
- By trading the second token, STUT

3.3. Added Value for the Student

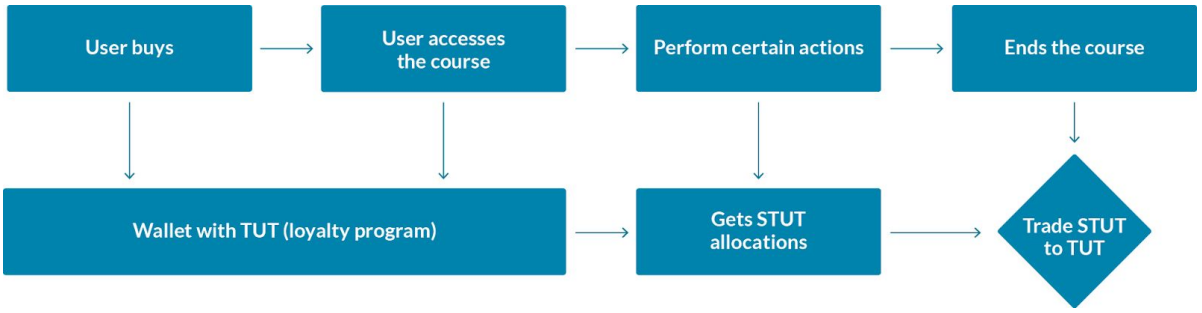
Each course has a set price in fiat currency and a price in TUT tokens based on the TUT value and a discount of 10% for paying in TUT tokens. Each course will also have a number of associated STUT tokens, depending on the price and duration of the course. Students who successfully finish a course get STUT tokens depending on the value of their contributions to the community. A full reward system will be implemented in order to foster activity and engagement.



The reward system will be decentralized, with the users themselves being the ones that ultimately decide how much a user has contributed to the community. Actions to be rewarded include:

- Asking relevant and insightful questions on the subject of a course
- Providing valid answers to questions from other students
- Applying the content taught in practical ways
- Successfully passing exams
- Submitting projects and related works
- Taking part in evaluations of other students via a rubric system
- Taking part in tutorials with other students
- Reviewing the course, rating it, and providing feedback for the improvement of both the teacher and Tutellus

Each action has an associated value of STUT tokens that is known to the user, with the final number giving a measure of the effort, dedication, and work put into the learning process. The maximum number of STUT tokens available for a course is one hundred times the price of the course in EUR. So a course valued 13€ will have 1300 STUT available.



Flow of STUT tokens (relevance) as a result of finishing a course

As the STUT tokens quantify the relevance inside the platform, they are not directly tradable, so what we actually give to the user during the course is the *right* to receive the tokens when the course is successfully finished. When the course is finished and closed, the student is given a chance to trade up to half these STUT tokens to TUT tokens, and after this decision the final result is stored in the blockchain through the deployment of a smart contract.

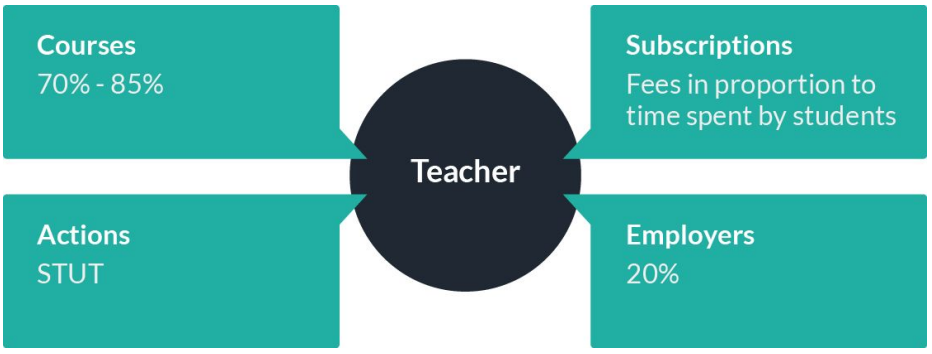
3.4. Added Value to the Teacher

Currently, teachers at Tutellus have two main income streams:

- First, teachers get between 70% and 85% of the price paid by the student when they buy a course.
- Second, they get an income from the subscription service fees, with which a student pays a flat rate to access Tutellus' content for a period of time. Teachers receive an amount from that fee that corresponds to the share of the time spent by the student in their courses.

With the implementation of the token infrastructure, Tutellus will become the first platform that creates a system to directly reward teachers for their performance, acknowledging the value contributed to the system through two additional income streams:

- From actions in their own courses that show commitment to the students, such as answering questions or evaluating projects, the teachers will get a higher relevance, as measured in STUT tokens. These STUT tokens can be traded partly to TUT tokens following the same model that applies to the students.
- Teachers may also receive 20% of the fees paid by companies using Tutellus in order to search for students to fill a job position if the contracted students learned the skills required for the position in the courses given by the teacher.



Teachers may receive income from up to four different sources

Both new sources will boost teacher motivation, and the additional effort and dedication will increase the quality of the final product. As with the students, the system is fully decentralized. It will ultimately be the members of the community who are the ones measuring the contributions and having a voice in how much their teachers are rewarded through these new sources.

The other big disruption in the model is the way teachers will be paid:

> **Instant Payment**
>
> The tokenization of the entire platform will enable instant payment for teachers, using tokens instead of fiat money, thereby improving drastically the payment terms for teachers
>
> The instant payment will cause an enormous market disruption, since no other EdTech platform has the capacity to immediately pay their teachers. Currently, the sector standard is between 60 and 120 days of delay. This improvement is expected to draw the best teachers to the Tutellus platform.

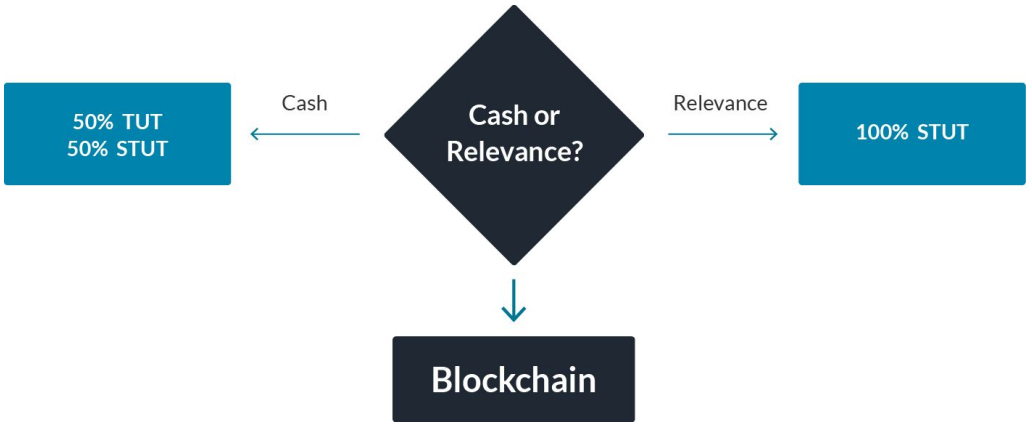
3.5. STUT to TUT trades

The trade of STUT tokens for TUT tokens monetizes the relevance showed inside the platform, as TUT tokens can be later spent. The decision to trade STUT into TUT will take place after successfully finishing a course, and will be limited to 50% of the total number of STUT earned during the course.

The trade cannot be done in the other direction: owners of TUT tokens will not be able to trade them for STUT. Reputation and relevance can only be earned through engagement in the platform and cannot be bought.

The STUT to TUT trade decision is driven by two opposing forces:

- The willingness to cash out the value provided to the community, and
- The willingness to grow in reputation and relevance inside the community, measured in STUT tokens, which provide benefits in the long term.



STUT tokens can be traded for TUT according to the preferences of the user (teacher or student).

The total number of STUT tokens in a course is one hundred times the price in EUR paid for the course and accounts for 100% of the price. Thus, there is a fixed exchange rate of 1:100 between EUR and STUT. On the other hand, TUT is a tradable token, and its price will be given by the law of offer and demand.

By using STUT tokens as the only measure of relevance for students using Tutellus, we hope to reward those who choose to hold onto their STUT as opposed to trading them for TUT. The ultimate goal is to promote long-term commitment to the platform instead of immediate, short-term benefits.

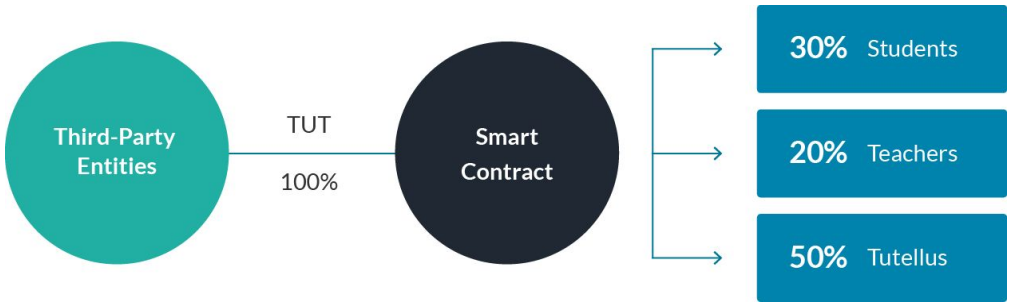
3.6. Company and Third-Party Access

The students' relevance, measured in STUT tokens, will quantify their excellence in a set of specific skills. The students with the highest relevance for a position and this will attract attention from third parties and companies searching for the best candidate to fill a vacant post. These high quality students are influencers with a proven and updated knowledge in their skills. By buying TUT tokens, companies may gain access to the best profiles.

The TUT tokens paid by companies to access the student profiles with highest relevance for the positions will be distributed as follows during the execution of the smart contract:

- 30% to the students with the proper profile.
- 20% to the teachers associated to the students.
- 50% to Tutellus.

The price to be paid by these companies and third-parties will be determined by the laws of supply and demand. For example, at the time of writing this paper, access to the profiles of the best Solidity developers would be more expensive than accessing those of the best Excel experts.



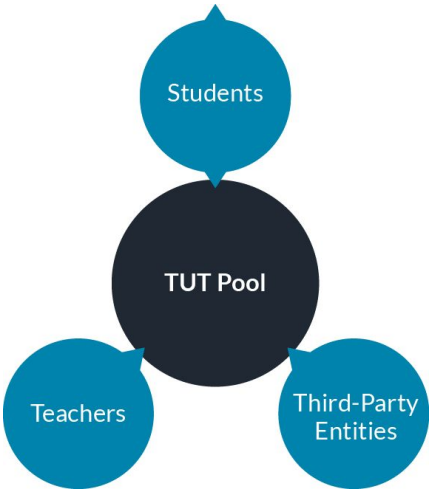
Share of benefits from services given to third-party entities

3.7. Scholarships, Foundations and NGOs

We will have two complementary ways to distribute Scholarships (and TUT tokens) to their students:

- Maximizing benefits: we will align third-party interests with targeted students (ie: a company looking for Blockchain developers with potential Blockchain students, according to their relevance). In this case we match offer with demand and solve a market need.
- Maximizing social impact: we will empower people from developing countries and with high relevance in order to help them learn and earn money, directing them to learn the most sought after skills available.

The input streams for the pool are the TUT tokens coming from teachers, third-party entities, and students paying with cryptocurrency.



TUT scholarship pool, with TUT tokens coming from students paying for courses with cryptocurrency, third-party entities and teachers buying services, and later distributed to the most relevant (number of STUT tokens) students and teachers

In addition, with a serious aim to improve education in developing countries, we will launch a Scholarship program with Foundations andNGOs:

Scholarship Program for underprivileged students

Tutellus will provide both users and companies with the ability to assign scholarships to any person or people in any part of the world, letting them study for free (and earn money while doing it).

To make this happen, we are negotiating with several NGOs (as main influencers) with a clear final goal:

- To let anyone give a scholarship to anyone else, either directly or in group, in any part of the world, and
- To let a company give scholarships to a defined target group of people, of any discipline or skill, letting them to earn money while they study.

The currency traceability being absolute, the model transparency assures that tokens and courses will arrive to the correct person or people.

3.8. Loyalty program

In order to reward loyalty inside the platform, between 5% and 10% of the price of the course will be granted in TUT tokens to all students who buy a course. The specific amount received by each individual student within this range will be determined by their relevance as measured in STUT tokens.

Like the other transactions, these will be deployed through smart contracts.

4. Tokenomics

4.1. Functionality

The following section details the flow of tokens inside the platform.

Student:

- A student buys a course or any other product inside the platform. For a paid course, the loyalty program grants the student a number of TUT tokens, up to 10% of the value.
- While doing the course, and due to the student's interactions that add value to the platform, the student obtains the opportunity to receive a number of STUT tokens. When the student finishes the course, the student can trade up to half of these STUT tokens to TUT.
- A student gets a scholarship granted by Tutellus to receive services for free or at a discount.
- A student gets a share of the TUT tokens granted by a third party in search of the best students for a position.

Teacher:

- A teacher creates a course and contributes this extra value to the community, which grants the teacher a number of STUT tokens. The teacher may trade up to half of these STUT tokens to TUT tokens.
- A teacher receives an income indirectly from the students buying the course or related services (fiat or TUT).
- A teacher receives TUT tokens from the companies in search of the best students.
- A teacher gives TUT tokens to the Tutellus pool in return for additional services within the platform.

Third-party entity in search of students:

- A company of recruiters in search of the best students grant TUT tokens to the pool in order to access top students in the platform—that is, the most relevant ones in each skill set.
- The most relevant students, with the highest number of STUT tokens in the necessary skills, get 30% of the amount, to be distributed equally.
- The teachers whose courses these students followed to get the STUT tokens get 20% of the amount from the companies, to be distributed according to the relevance of the teachers.
- Finally, 50% of the tokens go back into the Tutellus pool.

Tutellus:

- Gives TUT tokens to students from third-party entities and in-platform scholarships.
- Gives STUT tokens to students and teachers as a measure of their relevance.
- Gives TUT tokens to students and teachers in return for STUT tokens.
- Gives TUT tokens to students via the loyalty program.
- Receives TUT tokens from teachers in return for services inside the platform.
- Receives TUT tokens from companies and third-parties in search of the best students.
- Gets a commission for the sale of paid services, both in fiat and in TUT tokens.

At any time, any participant may trade TUT tokens outside the platform. The STUT tokens cannot be traded except inside the platform, only into TUT tokens, and with the limitations previously explained.

4.2. Token Distribution

During the initial token distribution (see 9.2), a portion of the tokens will be distributed between as many users as possible, both students and teachers, with a focus on the most active users on the platform. This initial distribution will kick off the flow of exchange as soon as the ICO ends.

- 60 million tokens will be offered during the Token Sale. Up to 30 million additional tokens may be issued during the sale if discounts are applied. No more tokens will be issued after the ICO.
- 10 million tokens for the team, with one year vesting.
- 10 million tokens for advisors, PR and others.
- 20 million tokens to be kept in a pool in order to activate the ecosystem.

4.2.1. Initial Study Grants

As a first step, scholarships will be granted to the most active users on the platform. We will rely on metrics already implemented and monitored during the last three years to perform the initial grant. An initial share of STUT tokens will be distributed, as detailed in Appendix II.5. Countries going through economic problems will be given preference in scholarships with TUT tokens.

4.2.2. TUT Token Flow State Model

By using a cash flow state model approach, we can develop a model for token inputs and outputs for the pool.

In the beginning a high number of TUT token scholarships will be granted, so many students will be able to study for free using the tokens they will have received, thus boosting activity and motivating the rest of the students. This increase in the activity will eventually lead to an input stream of tokens to the pool, both by purchases by other students and by the payments from teachers and third-party entities.

Token Outputs:

- Study grants: about 12% of the active students will get a grant, according at first to their activity and user type, and later according to relevance.
- STUT to TUT trade:
    - Students will get tokens from both free and paid courses. We will differentiate between students completing free courses (around 5-30% of the fre-course students) and those completing paid courses (between 30%-100% of the paid-course students). We will assume this 30% division in order for us to build out the model.
    - In both cases, the decision to trade STUT to TUT is expected to be taken by about 70→30% of the students, progressively, as the incomes from companies rise. The increase in potential incomes will be a high motivation for the students to hold STUT tokens as a sign of their relevance instead of trading them.

- Both outputs will eventually lead to a rise in the number of quarterly active users (QAU), which will trigger a rise in the free-to-paid conversion and the overall number of transactions.
- Loyalty program: when buying a course, the student gets 5-10% of the price of the course back in TUT tokens to use for future purchases.

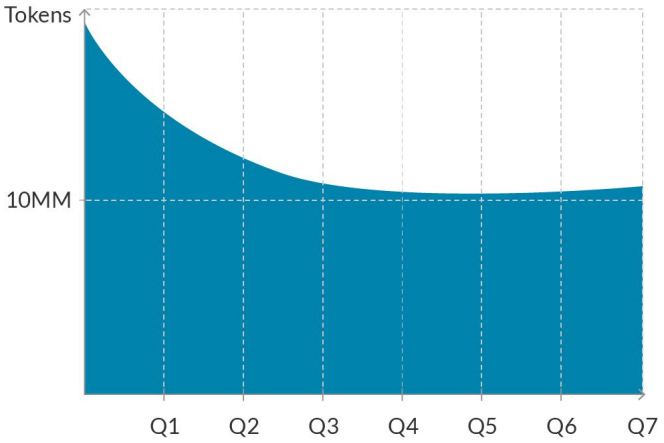
Token Inputs:

- Purchases in TUT tokens of any product in the platform.
    - Tutellus currently measures conversion of 2.40%, meaning that 2.4% of active users are paying in a quarter. We will start Q1 of 2018 with 350,000 students in countries where it is difficult to buy online using fiat money, and where we expect most students will buy courses with the TUT token. We will consider a minimum conversion of 0,5% growing to 6% overtime due to the growing use of the token overtime.
- Services to teachers.
    - We estimate, using the Pareto principle, that between 5% and 20% of the teachers will be interested in promoting their courses using various services (sponsored courses, Home page, email marketing, mobile campaigns, push apps, etc.).
    - The average quarterly income per teacher will be estimated between 200 and 500 USD. Teachers will only be able to access these services in TUT tokens.
- Services to companies.
    - According to the predicted number of geolocalized students and the job deficit, between 10 and 400 companies per quarter are expected to be interested in buying services to get access to profiles (job offers, lead access, influencers, etc.).
    - We will charge companies on average 2,000USD per quarter. These companies currently pay a finder's fee up to 20% of the annual salary of the hired candidate.
    - These services can only be bought using TUT tokens.

As illustrated by the following table, the token's distribution has a cascade effect, with the pool getting full again at the end of the first year; the goal is to keep the pool stabilised around 100 million tokens. If it goes higher, as in the predicted model, the number of grants will also get higher in order to bolster activity between the users.

	2018				2019			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1 - Output tokens	-501	-1,444	-2,891	-5,792	-7,265	-8,761	-9,936	-14,915
2 - Active students (QAU)	100	200	400	800	1,200	1,800	2,700	4,050
3 - Free transactions	200	400	800	1,600	2,400	3,600	5,400	8,100
4 - % free courses completed	*5%*	*7%*	*10%*	*15%*	*20%*	*25%*	*30%*	*30%*
5 - Paid - fiat transactions	2	5	12	32	60	99	162	243
6 - % conversion	*2%*	*2,5%*	*3%*	*4%*	*5%*	*5,5%*	*6%*	*6%*
7 - Free - token transactions	0	24	48	96	120	144	162	243
8 - % Students w Scholarships	*12%*	*12%*	*12%*	*12%*	*10%*	*8%*	*6%*	*6%*
9 - Scholarship tokens	-500	-1,440	-2,880	-5,760	-7,200	-8,640	-9,720	-14,580
10 - Scholarship value (USD)	250	720	1,440	2,880	3,600	4,320	4,860	7,290
11 - Tokens trade - choice	-1,1	-3,1	-8,8	-26,2	-52,6	-98,6	-177	-269
12 - % Students w Trade choice	*70%*	*65%*	*60%*	*55%*	*50%*	*45%*	*40%*	*30%*
13 - Fidelization program	-0,3	-1	-2	-6	-12	-22	-39	-66
14 - Input tokens	73	257	742	1,890	3,955	7,728	14,175	25,702
15 - Paid - token transactions	2	5	16	42	95	189	354	638
16 - Users in no - fiat	350	525	1,050	2,100	3,150	4,725	7,088	10,631
17 - *% Students buying*	*0,5%*	*1%*	*1,5%*	*2%*	*3%*	*4%*	*5%*	*6%*
18 - Tokens traded	52,5	157	472	1,260	2,835	5,670	10,631	19,136
19 - Teachers	1	2	3	5	7	8	10	12
20 - % Teachers w promotions	*5%*	*10%*	*15%*	*20%*	*20%*	*20%*	*20%*	*20%*
21 - Courses	3	6	9	14	16	19	23	28
22 - Average ticket (USD)	200	250	300	350	400	450	500	550
23 - Tokens traded	20	100	270	630	1,080	1,458	1,944	2,566
24 - Companies					*10*	*100*	*200*	*400*
25 - Average ticket (USD)					2	3	4	5
26 - Tokens traded					40	600	1,600	4,000
27 - Net status tokens	-428	-1,187	-2,149	-3,902	-3,310	-1,033	4,239	10,787
28 - Pool status	19,572	18,385	16,236	12,334	9,024	7,991	12,230	23,017

Token flow state model (figures in thousands)



TUT pool status through time

Glossary of terms.

1.	**Output tokens:**	**TUT tokens distributed by the Tutellus platform**
2.	Active Students (QAU)	Quarterly Active Users in the DApp
3.	Free transactions:	Free transactions by active users in the period.
4.	% free courses completed:	Percentage of free courses successfully finished.
5.	Paid fiat transactions:	Courses paid using fiat (€, USD, MXN, ...).
6.	% convertion:	Percentage of students buying not-free products.
7.	Free - token transactions:	Tokens earned by students through free courses.
8.	% students w Scholarships:	Percentage of students studying courses using scholarships.
9.	Scholarship tokens:	Tokens granted through scholarships.
10.	Scholarship value (USD):	Value of the scholarships (USD).
11.	Tokens-trade choice:	Tokens traded for relevance.
12.	% Students w trade-choice:	Percentage of students trading for TUT tokens.
13.	Fidelization program:	Tokens given through the loyalty program.
14.	**Input tokens:**	**TUT tokens received by the Tutellus platform**
15.	Paid - token transactions:	Courses paid using fiat
16.	Users in no-fiat:	Users buying products with TUT tokens.
17.	% Students buying:	Percentage of active users buying in TUT tokens
18.	Tokens traded:	Tokens coming from purchases in TUT tokens.
19.	Teachers:	Active teachers in the period.
20.	% Teachers w promotions:	Percentage of teachers buying services (promotion/marketing).
21.	Courses:	Number of active courses in the platform.
22.	Average ticket (USD):	Average ticket for teacher per quarter for the services.
23.	Tokens traded:	Tokens bought by the teachers for the services.
24.	Companies:	Number of companies buying services per quarter.
25.	Average ticket (USD):	Average ticket per company.
26.	Tokens traded:	Tokens bought by the companies.
27.	**Net Status tokens:**	Inputs - Outputs.
28.	**Pool status**:	Pool State: previous + inputs - outputs.

4.2.3. Reserve

The pool is also part of a reserve of both ETH (from the fundraising) and TUT (from the pool), accounting for about 20% of value of the TUT tokens, that will be used to stabilize the price of the token. To this end, we may use this reserve to sell or buy tokens.

4.3. Token Governance

The token monetary policy will be governed by the following business rules:

4.3.1. Related to Relevance

- The relevance, as measured by STUT tokens, is associated with predefined micro-skills through tree-based tags.
- The price of the TUT token is given according to supply and demand, while the price of the STUT token is linked to the EUR: 1 € = 100 STUT.
- We start with a STUT pool of ten times the size of the TUT pool (1 billion STUT), distributing in a first step 10% of the pool among the active users according to a Zipf/Pareto model (see Appendix II.5), and later adjusting the number of STUT downward as we distribute the tokens to students with less relevance, a process described in Appendix I.1.
- The entire governance model is detailed from an econometric point of view in the Appendices.

4.3.2. Related to Courses

- The price and duration of the course are the key factors in determining the number of STUT tokens associated with it. The higher the price and duration, the larger the amount of tokens.
- Free courses have a maximum relevance (STUT tokens) equal to 1/10th of equivalent paid courses, adjusted for the duration and price of the paid courses of the same type. For example, if the average for the paid courses belonging to the “Databases“ skill is 90€ (9,000 STUT) and 3 hours, a free course of the same skill and duration will get a maximum of (9,000/3)/10 = 300 STUT, and a free course of the same skill and only one hour long will get a maximum of ((9,000/3)/3)/10 = 100 STUT.
- In both paid and free courses, only the most relevant student will get the maximum number of STUT tokens, with the rest of the students receiving a lower number. This distribution is detailed in the Appendices.
- Following a decentralised model, actions will be validated by rubrics. For example, a student answering a question will need a fixed number of students to validate the answer.
- Users with enough relevance will be able to take high value decisions such as:
    - Courses approval
    - Career design
    - Tutor mentoring
    - New category proposals

4.3.3. Related to the Trade Decision

- Any student will be able to make the decision of how many STUT tokens for each course are traded to TUT tokens at the end of the course. The decision will be stored in the blockchain and cannot be modified.
- The STUT tokens granted by the actions done during the course will be registered in a wallet, but will not actually be granted until the trade decision. Due to the cost associated with its execution, this decision can only be made once.
- By implementing a token trade per course, every student may choose which courses/tokens will be kept to measure overall relevance, and which will be cashed out, thus being able to maintain the relevance in some skills while trading in others.

4.4. Full Workflow

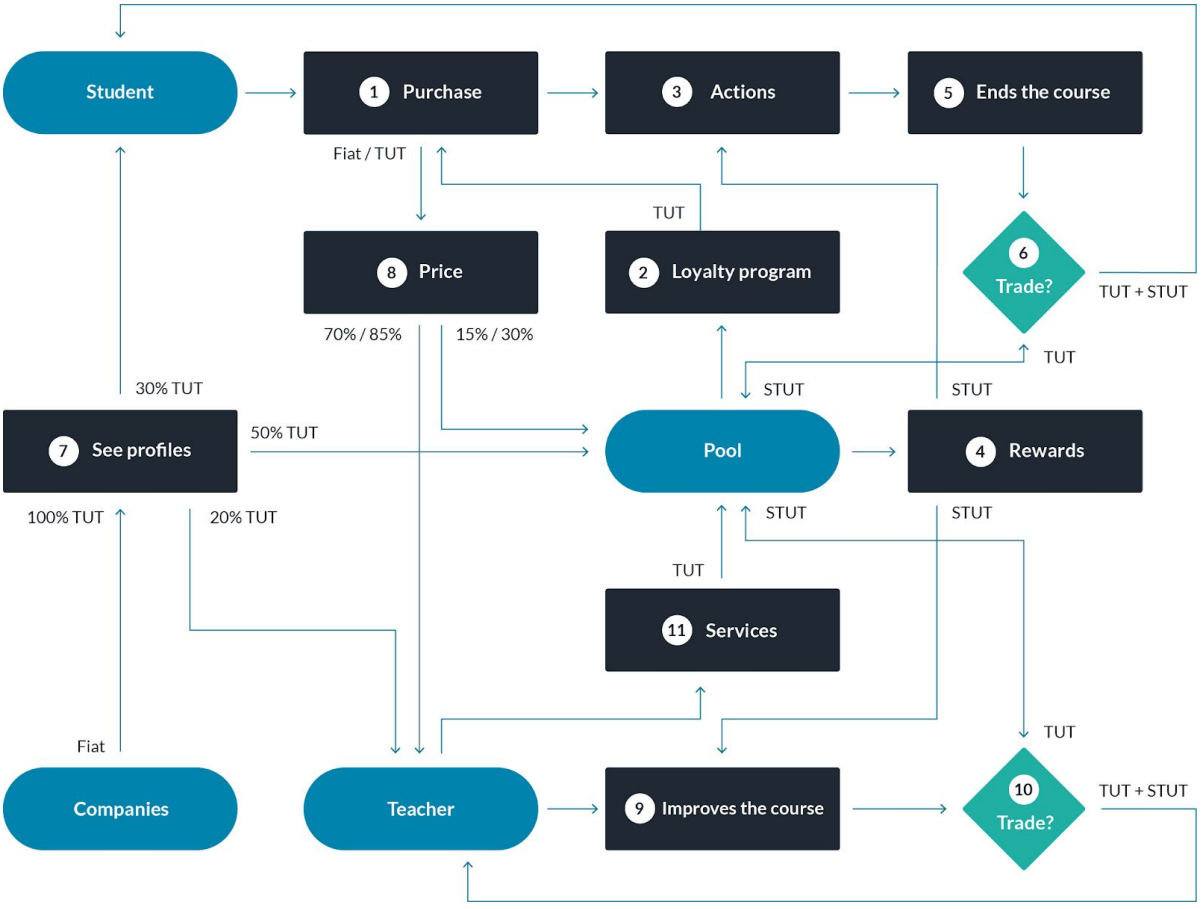
An example of the full workflow describing the platform could be as follows:

- A student pays 30€ for a course (1). The same student could get the course for free through a study grant. If the payment is done in TUT tokens, the student gets a 10% discount.
- With the loyalty program, the student gets back between 5% and 10% of the price in TUT tokens (2). A wallet is created to store the TUT tokens, which will also be used to store the STUT tokens which will be generated at the end of the course and after the STUT-to-TUT trade decision (6).
- The student starts the course and, by doing actions that add value (3), gets a number of STUT tokens (4) from the Tutellus' pool, up to a hundred times the price of the course in euros, in this case up to 3,000 STUT, which show the student's relevance inside the platform.
- After successfully finishing the course (5), a trade decision is made (6): either the student keeps the STUT tokens as relevance or trades up to 50% of them to TUT tokens, with the STUT tokens keeping a fixed trade rate of 100:1 with the EUR, and up to 15 EUR worth of TUT tokens. It is at this point that the information is stored in the blockchain, with the student that traded 50% of the 3,000 STUT tokens earning TUT tokens worth 15€ and keeping 1,500 STUT tokens to show as relevance. If the trade is not done, the student keeps 3,000 STUT as relevance, increasing the chances of earning additional income later.
- At the same time, a company is searching for the best students in certain skills, to fill a job position (7). The company buys TUT tokens in an exchange and gives them to Tutellus to get access to the best user profiles for certain skills. If the user who bought the course is one of the most relevant students, measured with the STUT tokens, the user will be selected as a candidate, and get a part of the fee paid by the company.
- The company fee is distributed as follows: 50% will be for the platform, 30% will be distributed between the candidates, and 20% to the teachers of the courses where the students learned the skills.
- The teacher will get a fee from the course purchase (8), either in fiat or TUT tokens. In addition, the teacher will be rewarded in STUT tokens (4) for actions that increase platform value (9), tokens that may be kept as relevance or traded to TUT, as in the students' case (10).
- In addition, the teacher will get a share of the fees coming from the company that found the student (7), thus getting a boost in motivation.

- Finally, the teacher can buy products or services inside the platform (promotion, campaigns, etc.) using TUT tokens (11).

This closes the circle, and we get an ecosystem where everyone wins.

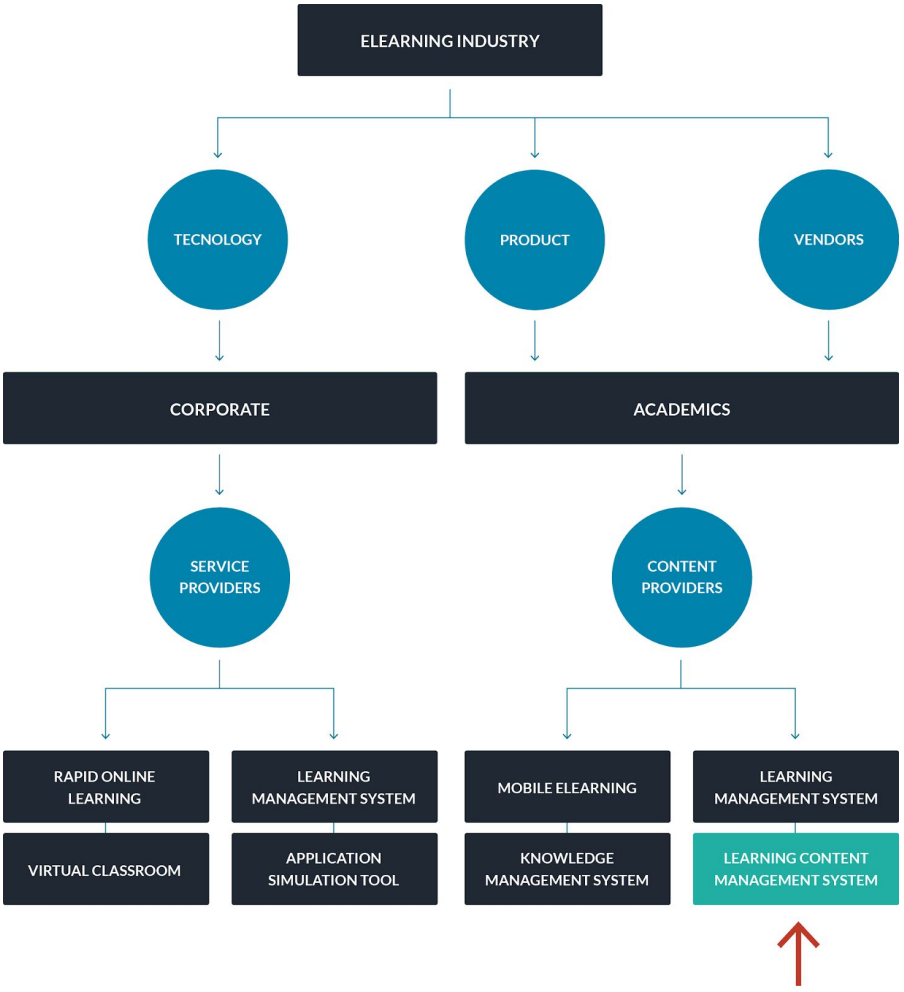
The STUT tokens can not be traded except inside the platform, only into TUT tokens, and with the limitations previously explained.



Flow of TUT and STUT tokens inside the platform

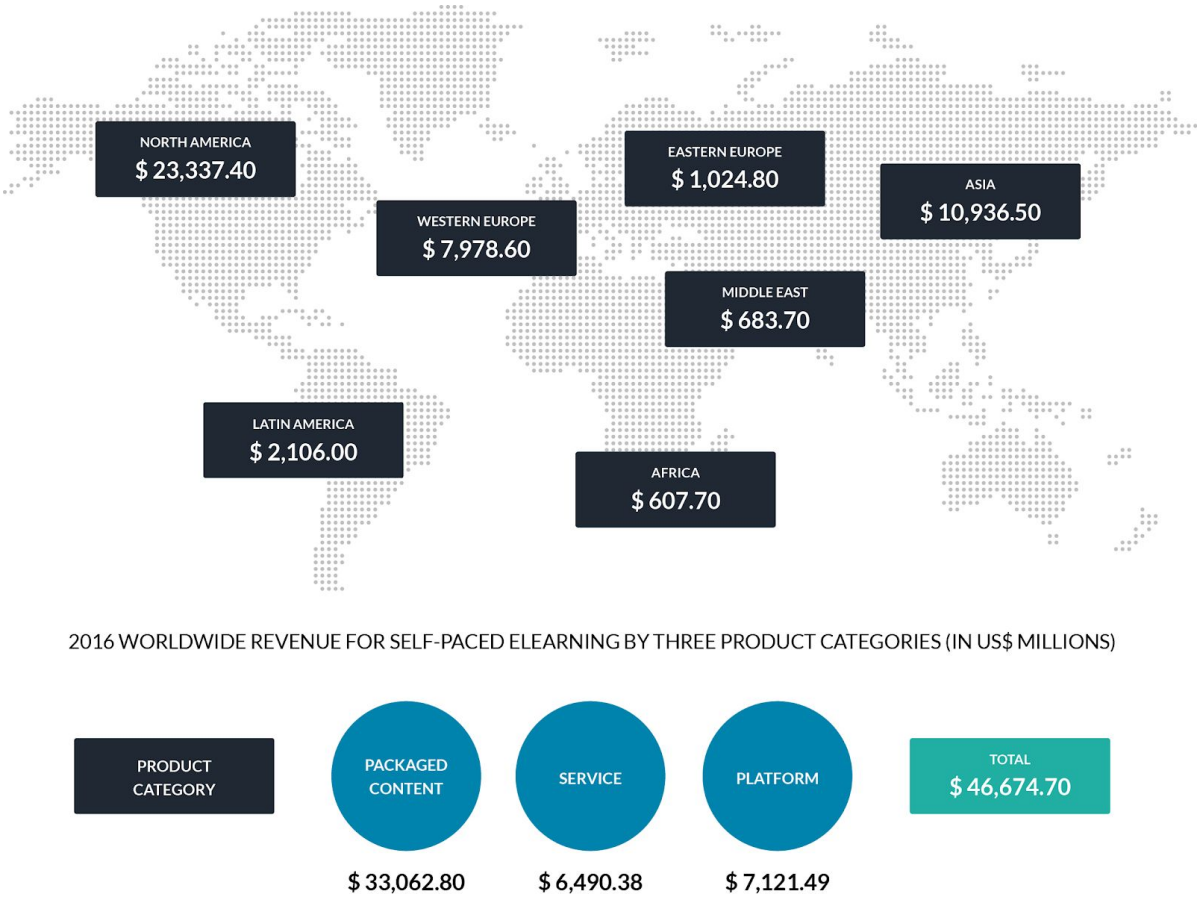
5. The Market

According to Forbes, the online education market was worth over USD 165 billion in 2016, mostly in the English-speaking world (USA, the UK, and India). It is expected to keep growing, reaching over USD 240 billion in 2023 (source: Docebo)



Source: Ambient Insight Research

The Tutellus target submarket was worth USD 33 billion in 2016, with over 90% located on North America, Asia and Europe. Latin America accounted for only 4% of the submarket, with an immense growing potential.



Business distribution for "Learning Content Management System." Source: Ambient Insight Research

5.1. EdTech Companies

There are multiple sub-markets to distinguish:

- MOOC Platforms. Coursera, Edx. The content is available during a specific amount of time, and it is created by Universities. No relation with the job market.
- Subscription Models. Lynda, Pluralsight, and others. Focused on vertical markets and B2B.
- Marketplaces. Udemy, Skillshare, and others. No relation with Universities, focusing on the less valuable product (courses). No relation with the job market.
- Specialized platforms. Udacity being the leading company. Video courses to train professionals in a short period of time, about 4-6 months. Discretional relation with the job market.

- New projects on blockchain: we have found three startups starting right now, but lacking a product already available in the market, a pool of students, a track record in the sector, and an ability to start courses immediately: beOne, DLS Academy and BitDegree. Only BitDegree seems to have a well defined model.

The following table shows all players involved, pointing out pros and cons of each:

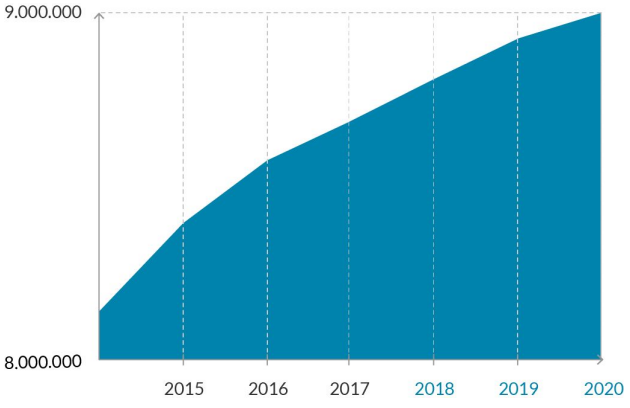
	Tutellus	Udemy	Coursera	Edx	BitDegree	Lynda
Free or paid courses?	both	paid	both	both	free	paid
Does the student earn money?	yes	no	no	no	yes	no
Free certification?	yes	no	no	no	yes	no
Value through third entities?	yes	no	no	no	yes	no
Collaborative platform?	yes	yes	no	no	no	no
Tested technology?	yes	yes	yes	yes	no	yes
Already available courses?	yes	yes	yes	yes	no	yes
Track record in EdTech?	yes	yes	yes	yes	no	yes
Blockchain integration?	yes	no	no	no	yes	no
Value*	**10**	5	5	5	4	4

EdTech platforms. Value of 0 / 1 / 2 depending on the value added by tokenizing the service.

The biggest platforms have internal structures involving hundreds or thousands of employees, and it would be extremely difficult to move all services and technology to blockchain. Only Tutellus has integrated blockchain technology, a track record in EdTech, and a business model that is proven to benefit everyone involved in it.

5.2. Relationship between Education and Employment

The demand for highly specialized profiles, particularly in the IT market, is expected to experience a massive growth in the following years, both in Europe and in the rest of the world. Multiple studies point toward a great need for people with the right academic formation in the near future.



Expected demand for IT professionals for the following years in Europe.

At the same time, the market itself has identified clear training opportunities for specific skills. With Tutellus we will promote the formation of these skills while offering services to third-party entities in search of them.

Job Profiles	2016	2017	2018	2019	2020	2021
Front-End Developer	20	-4	-7	-9	-26	-82
UX/IU Designer	30	-15	-62	-62	-71	-74
Digital Product Manager	4	-1	-2	-12	-73	-63
Back-End Developer	15	-5	-27	-9	-45	-52
Solution Architect	5	0	-1	-1	-1	-2

Expected demand on technical positions for the following years. Source: BCG

There is a strain on the market, with a multitude of companies fighting in the upcoming years for the best candidates to fill their vacant posts.

5.3. Issues during the Search for Talented Candidates

Employment platforms, headhunters, and temporary employment agencies are experimenting serious roadblocks to offering quality products to find and select acceptable candidates for the companies in need of them. They are using models that worked in the previous century and are not suitable anymore.

The final experience with these platforms, of all sizes and in all sectors, tends to be negative:

- The candidates do not fit the needs of the companies.
- The training that they are supposed to have does not become apparent.
- The margin for any person hired is high (usually 20% of the first year's salary).

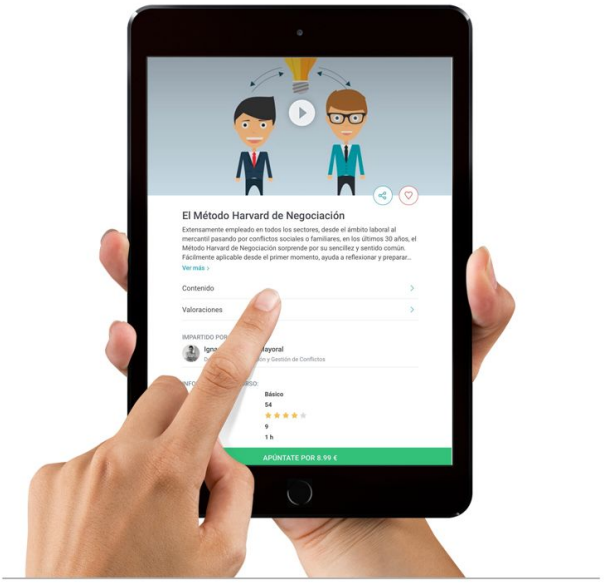
Our decentralized model allows us to do a far better segmentation of the potential candidates. We are able to offer companies the most optimal profiles with a filtering by skill deeper than anything seen before.

For instance, when searching for a candidate with knowledge on Javascript, we can find out how much of the knowledge is associated with NodeJS, how much with JQuery, and so on, combined with as many micro-skills as desired.

6. The Company

6.1. Figures and Traction

Tutellus is the biggest online educational collaborative platform in the Spanish-speaking world. We started in May 2013 and now we have a community of one million users from 160 countries, with over 130,000 video courses, positioning us as the leading platform in the market.



VISIT TUTELLUS

We have agreements with over 80 universities and business schools for the distribution of unique content, as well as four joint ventures for the issuance of university degrees with exclusive content.

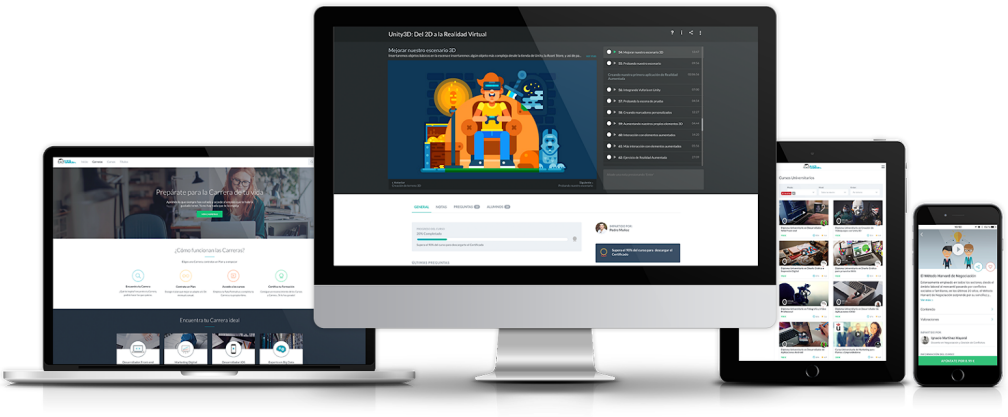
Our base product is the video course: educational packages formed by videos and additional services that improve the learning experience. From this core element we offer products with added value and higher prices, such as subscription services or University degrees.

1,000,000 STUDENTS	2,000,000+ TRANSACTIONS	1b+ min LEARNING	$10M TRADES
120,000+ VIDEOCOURSES	3,000 TEACHERS	80+ EDUCATIONAL INSTITUTIONS	160 COUNTRIES

Over the last four years of steady growth we enabled over two million transactions inside the platform, representing USD $10 million, and more than a billion minutes spent on online education. An exhaustive analysis of the user behavior has given us a profound knowledge of their needs and the best training opportunities for each of them.

We now aim to become THE online educational decentralized platform worldwide by bringing an additional, unique advantage: ***Tutellus is the only platform that pays you for learning***. The traction created around this new concept will be the force drawing new offers and demand in all languages.

The company has so far invested 1.5 million USD to date in developing the platform, defining the target market and the value proposal.



6.2. The Team

Here are the technical profiles of the key team members in the company, all located in Madrid, Spain.

Miguel Caballero, *CEO, co-founder*
20 years in Business Administration and Management. Miguel is an industrial engineer with an MBA from the Instituto de Empresa (1999) and a serial entrepreneur. In 2000 he founded Quoba (sold to IBM), in 2002 Neomedia (closed in 2010), and MET (spin-off of Neomedia, sold to Vectalia). Since 2012 Miguel has been completely focused on Tutellus.

Javier Ortiz, *CTO, co-founder & main developer*
25 years as a programmer. Java evangelizer, open-source project contributor and entrepreneur. Founder of Sokartec, has worked for Apple and Telefónica in multiple R&D projects from 2002 to 2011. After meeting Miguel at University (both are from Alicante) in 2007, they started developing professional products together. In 2012 they joined forces to create Tutellus.

Carlos López, *Backend & blockchain developer*
15 years as a programmer. Computer engineer, has developed the infrastructure and services of Tutellus since 2014. An expert on Docker, microservices and NodeJS. Miner and fan of blockchain, Bitcoin since 2010, and now NEM.

Javier Calvo, *Engineer, mathematician & tokenomics manager*
25 years of experience. Degree in Mathematics and computer engineer. Manager of deep learning projects inside the company and the math behind the tokenization of the platform. Designer of the algorithm stabilizing the Tokenomics flow in the long term.

Karolina Szymańczak, *UX & Designer*
10 years of experience. Graphic designer with a track record of working with apps in BQ and other projects. Since 2014, Karolina has been in charge of the entire interface design, as well as the services inside the platform.

Jaime Zapata, *Operations*

Jaime manages the relationship between users, teachers and students within the platform. He works looking for new content and reinforcing the community. He studied Publicity & PPRR and is a blockchain fan since 2016

Nacho Hontoria, *Marketing Manager*

10 years of experience in Marketing and SSMM industry. Coordinator of different portals in ATRESMEDIA and founder of Cantera Digital. Nacho is familiar with both Blockchain and Sports topics, producing a unique combination of both industries

Alex Ginés, *PR & Community*

10 years in IT industry, the last 4 years in Blockchain. Previously in Atraura as CMO, Alex is the founder of Jarvis.io and has worked also in VR industry, with experience in Public Relations and Communication

Covadonga Fernández, *Relación con Medios*

30 years of experience as journalist. Founder of Blockchain Media, Observatorio Blockchain and Comunica Blockchain. Associate to PUBLIQ and Criptonoticias. Cova is one of the most influential crypto journalists in latin countries

6.3. Advisors

Eddy Travia

CEO & Co-founder of London-listed Coinsilium Group Limited (NEX:COIN), venture builder, investor and accelerator of blockchain startups. Pioneer Investor in blockchain and bitcoin startups since 2013. Nominated among the top 3 'Most Influential Investors of the Year' at Blockchain Awards 2014.

Miguel Solana

Blockchain and VC advisor since 2011, ex-head of new initiatives in Santander China. Worked with the World Bank. Postgraduate courses on the Stanford University and the London School of Economics.

Oleg Postokin

Entrepreneur, startup founder, go-to-market strategist. CEO of Cryptonomos, the most important platform for secure token sales. Also founder of Viar.live, a platform that makes easy to create and share VR content, and Enkrypt, a revolution in the way attorneys communicate with clients. Xsolla VP.

Yacine Terai

Nearly 15+ years global experience in Business Growth, Marketing Strategy and managing global startup ventures. Specialized in Token crowdsales for innovative startups. Former VC @Coinsilium Group, recently founded StartupToken, a Blockchain Hyper Accelerator.

Rene Lauk

CEO Oblicity and legal counsellor for Estonian Government, working on the Legal framework for distributing European Union structural funds. Tallinn University Degree with honors

Daniel Díez

Global Head of Blockchain UST Global. ESIC professor, co-author of "The Blockchain book". Working on Blockchain since 2011, being cofounder of Furai.co, Blockchain Toolkit, Bit2Me & YUROHS. One of the references in the ecosystem.

6.4. Partnerships

Tutellus works closely with educational and blockchain related institutions such as:

NEM Foundation
The NEM Blockchain is one of the top Blockchain in the crypto world, with an excellent match with the Tutellus platform through its layered infrastructure and APIs.

Coinsilium
One of the references in the Blockchain ecosystem. Investors on RSK, Coindorse, and Coindash, Coinsilium is a London listed company with a strong presence in Asia.

Cryptonomos
The most relevant platform for ICO retail, Cryptonomos has managed some of the most exciting ICOs in the world, raising more than 200 million USD for them.

Avolta Partners
One of the main european firms in VC, M&A and crypto fund. Based in Paris, the company has raised with + 200 million € for their startups.

StartupToken
A global company focused on promoting and boosting a few startups through Asian markets, giving them visibility in local ecosystems.

Oblicity
Oblicity is a leading corporate and internet law firm in Estonia, which offers the most advanced token sale framework in the European Union. Oblicity has been involved in +10 ICOs, raising USD10 - USD 75 million in each one.

Donnelley
Donnelley Language Solutions is a Donnelley company (a centenary company with +1bn Revenue), based in NYC and with the goal to provide global solutions worldwide.

Indorse
A professional network with emphasis on skills validation, and works with Tutellus improving the students experience through real accreditations.

Agreements with Latin America and Spanish Universities

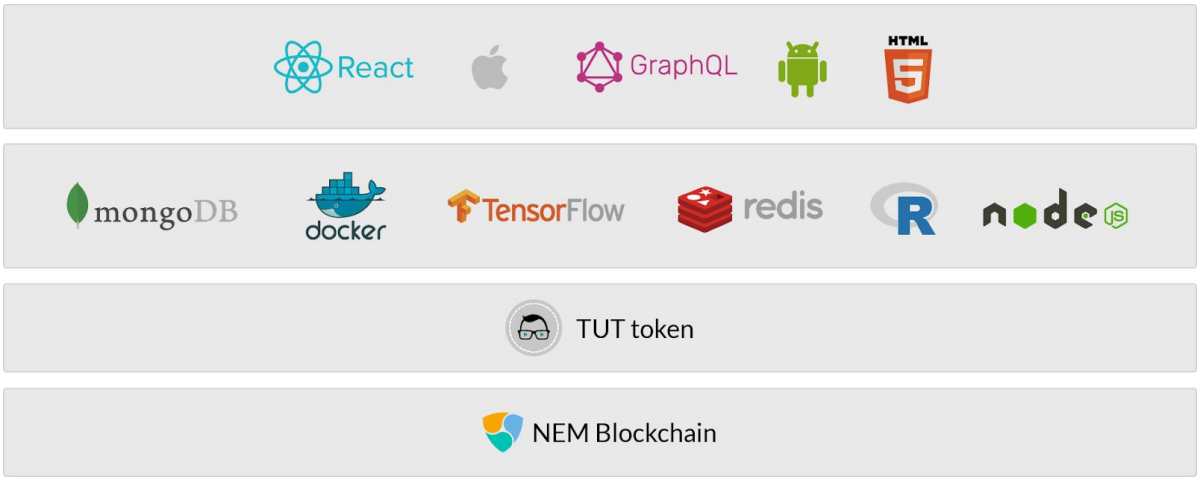
Over 70 agreements with the main universities and business schools in the Spanish- speaking world to promote content created by them, covering all topics and levels.

These agreements translate into over 50,000 video courses available in the platform, with free distribution allowed, for anyone interested in learning.

7. Technology

Tutellus will use a four-layer architecture, as follows:

- **Multi-platform Application**: providing services both to apps (Android, iOS, web apps, etc.) and decentralized services. Fully developed and already in production.
- **Microservices API**: Open-source API providing methods and functions to the services. Partly in production (Affiliates API).
- **Token**: Fully tradable token, TUT, built on the NEM blockchain.
- **Blockchain**: Database where we will store the relevance of the users and any deployed smart contracts.



7.1. Multi-Platform Application Layer

This layer is fully developed with the following features:

- ReactJS as front-end, migrating to React Native
- Customized React interface based on GraphQL for business intelligence and econometrics.
- AI Chatbots for support services and lead acquisition
- Services to apps (Android, iOS, web apps, etc.)

7.2. Microservices + API Layer (Tutellus.ai API)

Tutellus already has a public API already in production for affiliate management. This interface gathers together the methods and functions for the services that work to integrate the platform with third-party websites and apps.

- Designed to operate in the main languages: NodeJS, JavaScript, Python, PHP, and Ruby
- Docker.io for microservices
- NodeJS as core
- MongoDB as a NoSQL database

- R and Python for big data analyses
- TensorFlow for deep learning
- Redis and environments for other projects built around the API.

7.3. Token Layer (TUT)

The TUT token follows the NEM standard and is fully integrated with this ecosystem, being able to be stored on the XEM wallets.

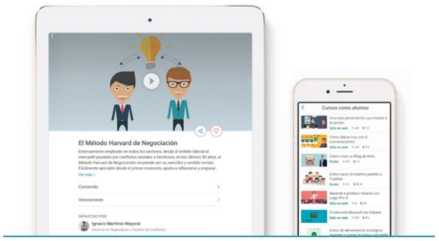
7.4. Blockchain Layer

In this layer, Tutellus will store the results from the transactions between all participants, as well as the relevance of the users by skill and micro-skill.

The choice of NEM as partner to deploy the APP is due to market reasons, including:

- Speed. NEM is able to run about 1,000 transactions per second, far more than Ethereum (7 per second). With the new version this number is expected to rise to over 4,000
- Customization. NEM allows to deploy internal blockchains, with no fees for transactions, that we will use to keep track of the tokens' movements
- API-centered connectivity and JS libraries, in line with the technological stack on Tutellus.
- Support from the NEM Foundation during the development.

8. Roadmap



Operating without interruption since 2013, now is the time for Tutellus to make a quantum leap, migrating most of its infrastructure, applications and services from the current stack (microservices built around an API against a MongoDB database) to the blockchain. It will be a transparent process to the user, with all services functioning as before.

To date, the most important landmarks of the company concerning the platform have been:

- **April 2013** The platform is launched with 2000 video courses
- **January 2014** 10,000 video courses and 100,000 users
- **December 2014** Joint ventures with universities to create exclusive degrees
- **May 2015** New platform: API-based with microservices
- **October 2015** Over 50,000 video courses and 400,000 users
- **November 2015** Tuitermachine and other self-produced growth products
- **May 2016** Public API for affiliates
- **September 2016** Apps published in Apple and Google stores
- **February 2017** Collaboration with MIT on a deep learning project
- **September 2017** Over 130,000 video courses and 900,000 users. Move to blockchain.

There will be three large groups of services to be put into production during the following months:

- Services for users;
- Services for companies and third-parties;
- Services for other players through APIs.

8.1. Services for Users

- Wallet interoperability and management
- Implementation of internal operations with TUT and STUT cryptocurrencies
- Tokenization of the entire range of products (courses, subscription services, etc.)

The model will start working as soon as the users are able to gain relevance (STUT), and for that to happen, the platform needs to reward with tokens certain actions on the platform. It is therefore a

first priority to tokenize the activities that grant STUT tokens to the students, detailed in section 3.3, all of them related with the learning process of the student. These activities are expected to be fully implemented within Q1 of 2018.

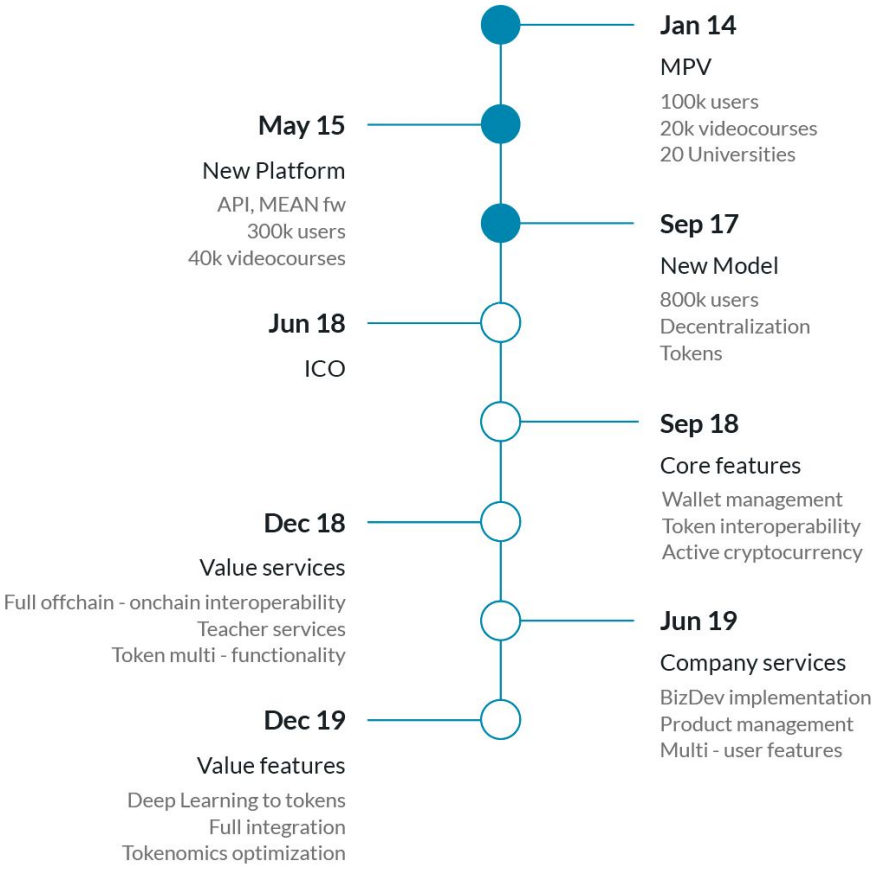
8.2. Services with Companies and Third-Parties

- Setting of parameters for access management, based on relevance
- Design of target entities (employers, organizations, companies, teachers)
- Creation of associated products (leads, big data, promotion, advertising, marketing, etc.)
- Implementation of smart contracts between all parties involved

8.3. Services with Other Players through API

- API publishing by microservices
- Token multifunctionality
- Tokenomics optimization applying deep learning techniques

Looking at this process chronologically:



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APPENDICES

Appendix I: the STUT tokens

The STUT token measures the educational value the user contributes to the Tutellus community, and is associated with a set of skills, both general (e.g., programming, history, etc.) and specific (solidity, php7, etc.). There are multiples ways for a user to earn STUT, but all of them are related with learning and with helping other users to learn. STUT tokens are not always tradable: they cannot be bought, and can be sold only under special conditions.

Initially there will be a STUT pool ten times bigger in size than the TUT pool (1,000,000,000). 10% of the initial pool will be distributed among the members of the community, students and teachers, according to the educational value provided by them at the moment. This gives us an initial quantification of the relevance of each member of the platform.

After that, students and teachers may earn STUT tokens from the pool by interacting with the platform. From time to time the state of the pool will be checked, and if the percentage of the tokens in the pool against the total number of tokens goes below a certain percentage, the pool will be increased in one of two ways:

a) Issue of New STUT Tokens.

This option implies a moderately inflationary model for the STUT tokens, with different goals:

- To make it easy for Tutellus to implement changes in the model in order to stabilize it;
- To slowly adjust the value of the payments in STUT already done without changing the nominal value and thus prioritizing the relevance recently obtained. A course finished two years ago will still provide the same number of STUT tokens, but the actual value of the amount will be less since there are more tokens in the system;

b) Withdrawal of a Percentage of STUT Tokens from students that have been inactive in the system for a long period of time who do not contribute educational value for themselves or for other users.

The goals behind this are:

- To assume the eventual obsolescence of the skills learned. After a while, the value of what is learned but not used becomes zero.
- To motivate the creation of more value in the community, either by learning or by helping others to learn.

The percentage of STUT tokens taken from the user will depend on the skill associated to the STUT tokens. Tutellus has a wide range of courses, from history to recent technology, and the rate at which how fast a course becomes obsolete greatly varies between subjects.

If the student takes the decision of trading the STUT, the value in TUT tokens of the traded STUT tokens is directly related with the price of the course, up to 100% of the price, depending on the relevance of the student and the commitment shown in the learning process.

With free courses, the value of the STUT token when traded is related to the duration of the course. It is possible to earn STUT tokens exclusively through free courses, without relying on grants, paid products, or other sources, but the amounts of STUT tokens obtained will be low. Quality education has a cost, and the educational value of a paid course should be bigger than that of a free course of similar content. This difference will thus be reflected in the platform's reward system.

STUT that are not associated with any course cannot be traded; they act as a measure of the knowledge and relevance of the user in their skills.

The teachers earn STUT tokens by doing activities in their own courses, ensuring the quality of the courses, and by contributing value to the community, according to a model similar to the students' model. By doing this we get a quantification of how valuable each teacher is for the platform. Often, teachers may also be students themselves; in such cases, the two reward systems will be treated separately.

Appendix II: Tokenomics in Detail

In this section we will provide a deeper look at some aspects of the model, detailing the economical and mathematical foundations behind it.

II.1. Token Sharing Model Based on Relevance

On multiple occasions through the TUT token flow, a certain amount of them is shared among a number of users according to the educational value contributed to the community. These shares are done using a simplified Zipf distribution.

Zipf's law is an empirical law, closely related to Pareto's principle, found in many aspects of real life, usually associated with popularity ranking, frequency of use, or relative relevance inside a set of elements. An ordered array of *K* elements

$$[v_1, v_2, v_3, ...v_k]$$

follows Zipf's law if the value of the element found in the *k* position, v_k is close to v_1/k , the value of the first element divided by the position of the element inside the array, for all values of *k*.

As an example, natural languages follow the law of Zipf. If we order the words that form the vocabulary of a language by how often they are used, the aforementioned property is found. For the English language the most often used word, ('the') is used close to 7% of the time in any text or collection or texts big enough for analysis. The second most often used word, 'of', is used about half as often, 3.5% of the time. The third most often used word, 'and', is used about 1.75% of the time, and so on. The same behaviour can be found in many other situations, such as population distributions, web page traffic, activated neurons in our brains after stimulation, or the number of people following a certain news channel. If there are enough elements in a set, it seems the Zipf's law structures their popularity or relevance in countless situations.

The decision to use this law to do the shares comes from three considerations:

- It properly values the effort made by the users, since it is based on a model that is often found in real life. Thus it can be considered a fair system.
- It rewards in greater quantities those users that provide high value to the community. This way the best users will get significant payments that cannot be easily discarded as irrelevant.
- It rewards all value provided, even those from the smallest contributions. This way all users actively providing value to the platform will be rewarded, with a clear cause-and-effect relationship between effort and reward.

All three considerations have a common goal: to motivate the user to participate. To work, the model should be completely transparent, with all users being informed of their relevance in the platform, the value associated with this relevance, and how much of a share this results in.

Let's call *A* the number of active users in Tutellus in a given skill at the moment of a share. To distribute a quantity, we need all users ordered in a decreasing order by relevance, measured in STUT tokens, both globally and for any given skill.

When distributing *B* in this set of users, every element found in position *k* is given *1/k* times the value of the first element. So the values to share are

$$[q, q/2, q/3, ...q/A]$$

Where the sum of the values is B

$$\sum_{k=1}^{A} \frac{q}{k} = B$$

$$q . \sum_{k=1}^{A} \frac{1}{k} = B$$

$$qS = B$$

This *S* is a harmonic series in which partial sums follow a logarithmic growth, a property that produces the features we are looking for. Its value for a finite number *A* is

$$S = LnA \ + \gamma + \varepsilon(A)$$

Where the second term is the Euler-Mascheroni constant (close to 0.5772), and the third is close to *1/2A* for high values of *A*. Given the values found for active users in Tutellus we can visualize the sum as

$$S = LnA + 0.5772 + 1/2A$$

And the shares thus being

$$[B/S, B/2S, B/3S, ...B/AS]$$

Some examples of distributing 1000 TUT between students with a given skill are provided here:

Students	S	Best student	Student 10	Student 100	Student 1000
1000	7,48	133	13,3	1,33	0,13
10000	9,78	1022	102,2	10,22	1,02
100000	12,09	8271	827,1	82,71	8,27

As expected, *benefits are quite significant for the best students, and very low for the last ones.*

It is important to keep in mind that these payments are in TUT, and so the real value in EUR or ETH of these rewards depends on the market value of the TUT token at the moment. Since the TUT token follows a deflationary model, an increase in the transactional market associated with a growth in the value of the platform will create a bigger value—measured in EUR or any coin other than TUT—of these rewards, following the growing and the increased worth of the entire community. It is

because of this that the community of users itself is the body that determines the ultimate value of the rewards, ensuring through their efforts that those are economically significant.

In this way, *a large increase in the value of the Tutellus community generates—through a totally transparent process—an equally large increase in the rewards the community can give back to its users.*

Other criteria, such as nationality, may be involved in the distribution of the tokens in order to help those coming from developing countries.

II.2. Gain Model for Students

One of the innovations offered by Tutellus is the distinct possibility for the students to get significant economic benefits, from both learning and helping other people to learn. The platform rewards the students that provide educational value to the community through the STUT and TUT tokens. The TUT token is a source of income, and the STUT token quantifies the effort of the student, with indirect benefits associated.

Let's take S_0 as the total number of STUT for a student at the beginning of a period. These STUT are associated with specific skills, in which the student knowledge and contributions are quantified by an array of *H* skills with associated values

$$H_0 = [s_{10}, s_{20}, s_{30}..., s_{H0}]$$

Which we consider follows a decreasing order. The sum of all values is greater than or equal to S_0 , since a single STUT may be associated with multiple skills, depending on the skills associated with the course it comes from.

This number of STUT determines the student position within the ordered array of students, with ω_0 the position of the student at the beginning of the period, and ω_{h0} the position of the student in the STUT array associated with the skill *h*. The *H* array is thus associated with a *P* array giving the relative position of the student in all the skills acknowledged:

$$P_0 = [\omega_{10}, \omega_{20}, \omega_{30}..., \omega_{H0}]$$

This example assumes that the student has not suffered STUT wallet penalizations as a result of significant period of inactivity. While a highly relevant student may still have significant earnings even after long periods of inactivity, this is not a common case. In addition, this modification to the model is quite trivial; it merely subtracts all elements s_{i0} from the student's STUT array according to the quantity taken.

There are four different sources from which a student can earn tokens:

1. Through paid products, usually courses.
2. Through free products.
3. By getting a share in income from companies and other third-parties
4. By getting a share in study grants.

The sum of these four sources—which can be TUT, STUT, or both—represents the total income.

II.2.1. Paid Products

Let's say a student finished *N* paid courses during a certain period, each one with a price p_i. Each course is associated with a set of skills, with the student who finishes the courses generating STUT associated with those same skills. Once finished, a course gives the student tokens in different ways:

1- STUT Tokens

At the end of the course the student gets a certain number of STUT tokens associated with the skills tagged in the course depending on the price of the course p_i and the level of additional participation and effort shown by the student α_i. This amount is quantified up to the equivalent of the total price paid for the course. Up to half of these STUT tokens can be traded for TUT tokens, so the final amount of STUT tokens, for a β_i percentage of STUT tokens traded to TUT, is:

$$I(STUT) = \sum_{i=1}^{N} p_i \alpha_i . (1 - \beta_i) \; ; \alpha_i \in [0, 1], \; \beta_i \in [0, 0.5]$$

2- TUT Tokens

The loyalty program provides the student with a number of TUT tokens, between 0.05 and 0.1 times the price of the course, to use for future purchases:

$$p_i * 0.05 * (1 + \mu), \; \mu \in [0, 1]$$

The value for μ depends on the global relevance of the student, quantified through the total amount of STUT tokens. Following the Zipf's distribution to reward this relevance, the share will depend on the position held by the student in the STUT array ω_0

$$\mu = \frac{1}{\omega_0}$$

Which gives us the total number of TUT tokens provided by the loyalty program:

$$I(TUT)_1 = \sum_{i=1}^{N} p_i * 0.05 * (1 + \frac{1}{\omega_0})$$

We must add here the total amount of TUT tokens coming from the trade of STUT tokens at the end of the course, as explained in the previous section:

$$I(TUT)_2 = \sum_{i=1}^{N} p_i \alpha_i . \beta_i \; ; \alpha_i \in [0, 1], \; \beta_i \in [0, 0.5]$$

Adding the price paid for the courses, the total balance for the student is

$$I(TUT) = I(TUT)_1 + I(TUT)_2 - \sum_{i=1}^{N} p_i$$

Which means that the completion of *N* paid courses, each with a price p_i, where the user is holding the ω_0 position in the STUT array of global relevance, has received a number of STUT tokens accounting for α_i of the price, and has traded a proportion β_i of them to TUT gives us the following total amount of TUT gained:

$$I(TUT) = \sum_{i=1}^{N} p_i.[0.05 * (1 + \frac{1}{\omega_0}) + \alpha_i.\beta_i - 1] \; ; \alpha_i \in [0,1], \; \beta_i \in [0, 0.5]$$

II.2.2. Free Products

The number of STUT tokens the student receives after finishing a free course depends on the duration of the course d_i through a function $f(d_i)$. This function is defined as a step function to avoid excessive values. The STUT obtained thus follow the same treatment as the STUT coming from the paid courses, with the user being able to trade up to 50% of them for TUT tokens.

So, if during a period the student finishes *M* free courses with a duration d_i each, after trading β_i of the STUT tokens, the student finally gets:

$$II(STUT) = \sum_{i=1}^{M} f(d_i).(1 - \beta_i) \; ; \; \beta_i \in [0, 0.5]$$

$$II(TUT) = \sum_{i=1}^{M} f(d_i).\beta_i \; ; \; \beta_i \in [0, 0.5]$$

II.2.3. Income from Companies and Other Third-Parties

During the period being considered, a certain number *E* of companies and other third-parties provide a number of TUT tokens associated with specific skills in which they are most interested, searching for a number of users adept at those skills. Being one of these potential candidates generates income for a student.

Let *H* represent the set of skills of a student with an ordered STUT array $[s_{10}, s_{20}, s_{30} \ldots, s_{H0}]$, which gives us an array of positions within the total of students for this skill, $[\omega_{10}, \omega_{20}, \omega_{30} \ldots, \omega_{H0}]$.

For each of these skills *h*, the third-party entities have contributed a number of TUT tokens $[T_{1h}, T_{2h}, T_{3h} \ldots, T_{Nh}]$ in order to find the best n_i students in the skill. Being among the candidates gives the student a share of 30% of the income provided by the entity, which is equally distributed between the number of selected students.

$$\sum_{i=1}^{E} \sum_{h=1}^{H} \frac{0.3 * T_{ih}}{n_i}$$

Where T_{ih} is the income given by the entity *i* for the skill *h*, searching for n_i candidates.

To get access to this income, the position of the user in the STUT array for every skill, ω_h, must be one of the n_i highest positions in the array, which gives us:

$$III(TUT) = \sum_{i=1}^{E} \sum_{h \in H, \omega_{h0} \leq n_i} \frac{0.3 * T_{ih}}{n_i}$$

It is important to keep in mind that the goal of these searches is to connect companies searching for specific profiles of skills with students who excel in those skills, so these benefits for the students inside the platform are just the beginning, with the opportunity to be hired by one of these companies being the ultimate goal.

II.2.4. Shares in Study Grants

Monetizing the platform lets the most active and valuable members take a larger share in the benefits to the whole community. This is implemented through a study grant system associated with skills of high interest.

In a certain period, a student receives benefits from study grants awarded for some of the *H* skills associated with the student. For these *h* skills, the funds are $[B_1, B_2, B_3, ...B_H]$ TUT, which are shared according to the application of Zipf's law detailed in a previous section

$$\frac{B_h}{\omega_{h0} * [LnA_h + 0.5772 + 1/2A_h]}$$

Where A_h is the number of active students during the period with the skill *h*, which ultimately gives us:

$$IV(TUT) = \sum_{h=1}^{H} \frac{B_h}{\omega_{h0} * [LnA_h + 0.5772 + 1/2A_h]}$$

Other criteria, such as nationality may be involved in the distribution of the grants in order to help people from developing countries.

II.2.5. Conclusion

As a result of the different sources of incomes, the final benefits for the student are:

Income (TUT):

$$G(TUT) = I(TUT) + II(TUT) + III(TUT) + IV(TUT)$$

$$G(TUT) = \sum_{i=1}^{N} p_i.[0.05 * (1 + \frac{1}{\omega_0}) + \alpha_i.\beta_i - 1] + \sum_{i=1}^{M} f(d_i).\beta_i + \\ + \sum_{i=1}^{E} \sum_{h \in H, \omega_{h0} \leq n_i} \frac{0.3 * T_{ih}}{n_i} + \sum_{h=1}^{H} \frac{B_h}{\omega_{h0} * [LnA_h + 0.5772 + 1/2A_h]}$$

Relevance (STUT):

$$G(STUT) = I(STUT) + II(STUT) + III(STUT) + IV(STUT)$$

$$G(STUT) = \sum_{i=1}^{N} p_i \alpha_i .(1 - \beta_i) + \sum_{i=1}^{M} f(d_i).(1 - \beta_i)$$

Where:

- *N* is the number of paid courses finished, each with a price p_i, with a participating coeficient $\alpha_i \in [0, 1]$
- *M* is the number of free courses finished, with a gain following a function on the duration of the course, $f(d_i)$
- $\beta_i \in [0, 0.5]$ is the proportion of STUT tokens traded to TUT tokens, both in free and paid courses.
- *H* is the set of skills known by the student
- ω_0 is the position of the student within the ordered array of relevance, measured with the total number of STUT tokens, and ω_{0h} is the position of the student within the ordered array of relevance for the skill *h*.
- *E* is the number of third-party entities searching for candidates to fill a job vacancy, each one contributing T_{ih} TUT tokens to get n_i candidates in a skill *h* known by the student.
- B_h is the fund contributed by Tutellus for the skill *h*, to distribute between the A_h students knowing this skill.

The student will get a total relevance (STUT) of

$$S_1 = S_0 + G(STUT)$$

In addition, for every skill *h* known, the student will earn the STUT associated with the skill, following the same formula, yet only counting the STUT coming from courses associated with that skill, with the *H* set that determines the relevance of the student in every skill becoming *H'*:

$$H' = [s_{11}, s_{21}, s_{31}..., s_{H1}] = [s_{10} + G_1(STUT), s_{20} + G_2(STUT), s_{30} + G_3(STUT)..., s_{H0} + G_{H'}(STUT)]$$

Which will give us a new position of the student inside the global STUT array ω_1, as well as new values for the STUT array for every skill, $P_1 = [\omega_{11}, \omega_{21}, \omega_{31}..., \omega_{H'1}]$, with the possibility of adding new skills to the array.

Let's have a deeper look at the four terms adding to the students' income.

The first term in the TUT income comes from the paid courses and is always negative, with a maximum of

$$Max(I(TUT)) = -0.4 * \sum_{i=1}^{N} p_i$$

With the losses becoming earnings for teachers and the platform.

The second term are the rewards coming from the free courses. Is not expected to become a significant source of income for the student, even though the balance for the student is always positive both in relevance and income.

The third and fourth terms (companies and study grants) can become positive and significant incomes, with these terms heavily depending on the position of the student inside the relevance arrays: the global array related to the study grants and the skill specific arrays when it comes to companies and other third-parties.

As a result, the number of STUT tokens is the key to a high income in TUT tokens. Therefore, the contribution of the student to the platform is the main driver of the student income.

Any student may have two different goals in mind when entering the Tutellus community, not mutually exclusive: either gaining relevance in some specific skills (STUT, perhaps to help find a job), or earning a direct income (TUT). The first goal quite obviously contributes to the addition of educational value to the platform, but the second, once analyzed, does the very same. If the student is getting high rewards, it is because the contributions to the platform in terms of effort and dedication have been high as well.

In this way, the key to the student's personal gain is always the community's gain, with the result being a community working together for the benefit of all parties involved.

II.3. Gain Model for Teachers

Teachers are the core element of any educational community. Consequently, they take part in the token flow and are rewarded for their efforts, both in income tokens (TUT) and in relevance (STUT).

The distinct feature Tutellus gives to its teachers is the possibility of gaining direct rewards as a result of the excellence of their students. The contribution of educational value from the students who learn from a given teacher may become a noticeable income for the teacher, with the goal of giving all teachers an added motivation to encourage the best from their students.

Just like in the case of the students, the relevance of a teacher inside the platform is quantified by a number of STUT tokens SP_0. These tokens are also associated to specific skills, with any teacher having associated an array of STUT $[sp_{10}, sp_{20}, sp_{30}..., sp_{H0}]$ in a number *h* of skills. If the teacher is also a student in the platform, which is usually the case, the STUT generated as a student are stored in a different array in order to avoid unfair comparisons between students and teachers of a given skill when it comes to the distribution of shares.

Let's call ωp_0 the position held by the teacher at the beginning of the period in the global array of STUT, and ωp_{h0} the position in the STUT array associated with the skill *h*. The STUT array is thus associated with a positional array *PP* that gives us the relevance of a teacher as compared with other teachers in every skill:

$$PP_0 = [\omega p_{10}, \omega p_{20}, \omega p_{30}..., \omega p_{H0}]$$

There are four different sources from which a teacher can earn STUT and TUT:

I. Sales of paid courses
II. Income from subscription services
III. Income from third-party entities
IV. Activity as a teacher of a course

The sum of these four sources—which can be TUT, STUT, or both—represents the total income.

II.3.1. Sales of Paid Courses

During a certain period a teacher sells a number *N* of courses, each one with a price p_i, retaining a percentage σ_i between 75% and 85% depending on the type of sale.

$$I(TUT) = \sum_{i=1}^{N} p_i \sigma_i;\ \sigma_i \in [0.7, 0.85]$$

II.3.2. Income from Subscription Services

One of the most popular products offered by Tutellus is the subscription service, by which the student gets the right to access as many courses they want for a specific period of time. Teachers get their share of the subscription fee depending on the total amount of time spent by the students in their specific courses.

Let *M* be the number of courses the teacher is getting an income from. For every course there is a number of students u_i, who have paid a fee c_i for the subscription during this period of time and who have spent some time t_i on the course. Over this value, let's also apply the teacher's share σ_i.

$$\sum_{i=1}^{M} u_i c_i t_i \sigma_i;\ \sigma_i \in [0.7, 0.85]$$

Currently there are three types of subscription services: monthly, quarterly, and yearly. The subscription price is calculated from the subscription payment *U*, divided by the number of times the income is calculated. If *W* is the number of times per month, the fee is

$$c = \frac{U}{W\rho};\ \rho \in \{1, 3, 12\}$$

Which gives us

$$II(TUT) = \sum_{i=1}^{M} u_i \frac{U_i}{W\rho_i} t_i \sigma_i;\ \sigma_i \in [0.7, 0.85], \rho_i \in \{1, 3, 12\}$$

II.3.3. Income from Companies and Third-Parties

During a specific period a number *E* of companies and third-parties searching for candidates with high levels of relevance in specific skills contribute a number of TUT tokens associated with such skills. A fraction of this income is distributed among the teachers associated with these students. A student is associated with a teacher in a skill if the student successfully finished one or more courses associated to the skill and was taught by that teacher.

For every skill *h* they are interested in, the companies and other third-parties contribute a number of TUT tokens $[T_{1h}, T_{2h}, T_{3h}..., T_{Nh}]$ while in search of the best n_i students. For every student associated to a certain teacher, the teacher will receive an income to be distributed according to a Zipf distribution related to to the relevance of the teacher..

If the STUT array of the teacher, by skills, is $[s_{10}, s_{20}, s_{30}..., s_{H0}]$, then we have an array of positions of the teacher relative to the rest of the teachers of each specific skill $[\omega p_{10}, \omega p_{20}, \omega p_{30}..., \omega p_{H0}]$, which will then determine the income.

Let's name *K* the number of students associated to the teacher that have been selected. For every one of them the teacher gets a share p_k of the 20% of the total income divided by the number of students searched.

$$\sum_{i=1}^{E}\sum_{h=1}^{H} p_h \frac{0.2*T_{ih}}{n_i}$$

The proportion depends on the position of the teacher in the STUT array ωp_{h0}, determined by a Zipf distribution as detailed in earlier sections.

$$p_h = \frac{1}{\omega p_{h0}*[LnT_h+0.5772+1/2T_h]}$$

Where T_h is the number of teachers with courses associated to the skill *h*. Adding all *K* students we have incomes for every E_k company and other third-party and H_k skill.

$$\sum_{k=1}^{K}\sum_{i=1}^{E_k}\sum_{h=1}^{H_k} p_h \frac{0.2*T_{ih}}{n_i}$$

Which finally gives us:

$$III(TUT) = \sum_{k=1}^{K}\sum_{i=1}^{E_k}\sum_{h=1}^{H_k} \frac{0.2*T_{ih}}{\omega p_{h0}*[LnT_h+0.5772+1/2T_h]*n_i}$$

II.3.4. Activity as a Teacher in the Courses

Just like the students, the teacher gets TUT and STUT tokens for additional educational contributions in the courses.

If the course is a paid course, the teacher gets a share α_i of the price p_i in STUT tokens, up to 50% of which can be traded to TUT tokens. For *NP* paid courses evaluated during a certain period we get:

$$IV(STUT)_1 = \sum_{i=1}^{NP} p_i \alpha_i.(1-\beta_i); \alpha_i \in [0,1],\ \beta_i \in [0,0.5]$$

$$IV(TUT)_1 = \sum_{i=1}^{NP} p_i \alpha_i \beta_i ; \alpha_i \in [0,1],\ \beta_i \in [0,0.5]$$

If the course is free, the number of STUT tokens is correlated to the course duration d_i via an increasing step function $f(d_i)$. As in the case of the paid courses, up to half of the STUT tokens earned can be traded to TUT.

If the number of free courses evaluated during the period is MP with a duration of d_j, after trading a part β_j' to TUT tokens, we have:

$$IV(STUT)_2 = \sum_{j=1}^{MP} f(d_j).(1-\beta_j'); \beta_j' \in [0,0.5]$$

$$IV(TUT)_2 = \sum_{j=1}^{MP} f(d_j).\beta_j' ; \beta_j' \in [0,0.5]$$

With a total number of TUT and STUT tokens of:

$$IV(STUT) = \sum_{i=1}^{NP} p_i \alpha_i.(1-\beta_i) + \sum_{j=1}^{MP} f(d_j).(1-\beta_j')$$

$$IV(TUT) = \sum_{i=1}^{NP} p_i \alpha_i \beta_i + \sum_{j=1}^{MP} f(d_j).\beta_j'$$

$$\alpha_i \in [0,1],\ \beta_i \in [0,0.5],\ \beta_j' \in [0,0.5]$$

II.3.5. Conclusions

Combining all possible sources of teacher income, the total benefit is:

Income (TUT):

$$G(TUT) = I(TUT) + II(TUT) + III(TUT) + IV(TUT)$$

$$G(TUT) = \sum_{i=1}^{N} p_i \sigma_i + \sum_{i=1}^{M} u_i \frac{U_i}{W \rho_i} t_i \sigma_i + \sum_{k=1}^{K} \sum_{i=1}^{E_k} \sum_{h=1}^{H_k} \frac{0.2 * T_{ih}}{\omega p_{h0} * [LnT_h + 0.5772 + 1/2T_h] * n_i} + \sum_{i=1}^{NP} p_i \alpha_i.(1-\beta_i) + \sum_{j=1}^{MP} f(d_j).(1-\beta_j')$$

Relevance (STUT):

$$G(STUT) = I(STUT) + II(STUT) + III(STUT) + IV(STUT) = 0 + IV(STUT)$$

$$G(STUT) = \sum_{i=1}^{NP} p_i \alpha_i \beta_i + \sum_{j=1}^{MP} f(d_j).\beta_j^{'}$$

Where:

- *N* is the number of paid courses sold, each at a price of p_i, with a profit percentage $\sigma_i \in [0.7, 0.85]$ depending on the type of sale.
- *M* is the number of paid courses u_i that students follow through a subscription service with a type $\rho_i \in \{1, 3, 12\}$, having paid a total amount of U_i for the service. There are *W* evaluations per month, and the time a student has dedicated to the course is t_i.
- *H* is the set of skills of each teacher, with T_h the number of teachers with the skill *h.*
- ωp_0 is the position of the teacher in an ordered array of relevance, given by the number of STUT tokens, and ωp_{0h} is the position of the teacher in the ordered array associated with the skill *h*.
- *E* is the number of companies and third-parties in search of potential candidates for a job offer, each one contributing T_{ih} to get access to n_i candidates with the skill *h*.
- *K* is the number of students selected by these entities E_k in the skills H_k and associated to the teacher.
- *NP* is the number of paid courses taught by the teacher that have been evaluated during the period at a price p_i, where the extra educational effort by the teacher has been quantified as $\alpha_i \in [0, 1]$
- *MP* is the number of free courses taught by the teacher that have been evaluated during the period, with an income depending on the duration of the courses following a function $f(d_i)$
- $\beta_i, \beta_j^{'} \in [0, 0.5]$ are the percentages of STUT tokens traded to TUT tokens in both paid and free courses.

The two first terms of the sum represent the traditional gain for the teacher in a traditional educational platform, with the third and fourth terms only being found in the Tutellus platform.

The fourth term determines the relevance of the teacher in the skills taught, giving a small benefit to the teacher and also being essential in the determination of the third term.

It is in the third term that the teacher is rewarded for both their own significant contributions as well as those of their associated students. This occurs in two ways. First, the relevance of teachers in a given skill determines the share they receive of the incomes coming from the companies and other third-parties. Second, since the quality of the courses determines in part the selection of the students, teachers earn an additional income every time one of their students is selected.

By doing this we encourage the commitment of teachers both within the community as a whole and within their own courses, thus forming a direct relationship between the educational efforts of the teachers and the income they receive.

II.4. Balance inside the STUT Pool

STUT tokens quantify the relevance of users, both students and teachers, by measuring the educational value given to the platform. Users draw STUT tokens from a pool maintained by Tutellus.

At the beginning, the pool will be ten times the size of the TUT pool. 10% of this pool will be distributed between the users according to their activity within the platform to date, which gives them an initial value for their relevance measured by their level of STUT.

From that point forward, the activities of both students and teachers earn them STUT tokens that come from this pool. From time to time, the state of the pool will be evaluated, with the long-term goal being to keep about 30% of all existing STUT tokens inside the pool.

II.4.1. Variation Due to User Activity

Let P_0 denote the proportion of STUT tokens in the pool at the beginning of a period, with a total number of *S* STUT tokens in the system as a whole. Throughout this period, a number of users *N* gets n_i of STUT tokens each, trading up to 50% β_i to TUT tokens. The amount of STUT lost is:

$$\sum_{n=1}^{N} n_i(1-\beta_i); \beta_i \in [0, 0.5]$$

The pool then moves to a new proportion

$$P_1 = \frac{P_0 S - \sum_{n=1}^{N} n_i(1-\beta_i)}{S} = P_0 - \frac{\sum_{n=1}^{N} n_i(1-\beta_i)}{S}$$

Let's call ΔP to the increase in this percentage.

$$\Delta P = -\frac{\sum_{n=1}^{N} n_i(1-\beta_i)}{S}$$
$$P_1 = P_0 + \Delta P$$

The total number of STUT tokens in the pool is $P_1 S$, and the increase of STUT tokens in the pool is $\Delta P S$.

II.4.2. Restoring the STUT Pool

If P_1 gets below 70%, the pool is adjusted through two mechanisms: tokens are taken back from students who have been inactive for a long time and new STUT tokens are created. The restoration of the pool is complete if the value of the P_1 percentage has gone below 30%, and between 30% and 70% a part λ of the percentage is restored, with λ given by a generalized logistic function inverted in the OY axis and with an inflection point of 0.5.

$$\lambda = \frac{1}{1+e^{K(-P_1+0.5)}}$$

The growth rate of the function, *K*, will be regularly updated after the real behavior of the platform is tested, with an initial value of 20.

By using this function the system will make conservative decisions close to 70% and more extreme decisions close to 30%, with a 50% of STUT tokens recovered if the new P_1 percentage is 50%. For *K=20*, the system recovers 2% of STUT tokens at 70% and 98% of STUT tokens at 30%. If $P_1 < 30\%$, then λ is considered to be 1. If $P_1 > 70\%$, then λ is considered to be 0.

The tokens added to the pool may come from two sources, either from inside the system, having been taken from inactive users, or having been created from scratch. If we call γ the proportion of STUT tokens coming from within the system, the STUT tokens added can be written as:

$$\lambda \Delta PS = \gamma \lambda \Delta PS + (1-\gamma)\ \lambda \Delta PS\ = R + \Delta S$$

Where *R* are the STUT tokens taken from the users and ΔS is the amount of new STUT tokens created and added to the system.

II.4.3. STUT Tokens Taken from the Users

The value for γ is determined by the number of STUT tokens taken back from inactive users. A user is considered an inactive user if a given amount of time has passed without any interaction with the system. This threshold will be determined by a study of the churn rate of the platform and will represent the period of time needed to assure, with 95% confidence, that a user will not return. Currently, this value is estimated to be 15 weeks, or 105 days. Further churn analyses will potentially modify this period of value.

From the inactive users we take a proportion p_i of STUT tokens, depending on the amount of linear time that the users have been inactive t_i, starting with 5% when the value of *t* is reached and never going over 20% of a user's STUT in a single period, a value reached at five times the value of *t*. A user with s_i STUT who has been inactive for a time $t_i > t$ suffers the following loss of STUT

$$min[0.2,\ 0.0125(3^{\frac{t_i}{t}}\ + 1)] * s_i$$

For M inactive users, the amount of taken STUT tokens is

$$\sum_{i=1}^{M} min[0.2,\ 0.0125(3^{\frac{t_i}{t}}\ + 1)] * s_i$$

Which is the value of R in the equation that gives us the number of STUT given to the pool.

$$R = \gamma \lambda \Delta PS = \sum_{i=1}^{M} min[0.2,\ 0.0125(3^{\frac{t_i}{t}}\ + 1)] * s_i$$

With a final value for γ expressed as

$$\gamma = \frac{\sum_{i=1}^{M} min[0.2,\ 0.0125(3^{\frac{t_i}{t}} + 1)] * s_i}{\lambda \Delta PS}$$

Which is used to determine the number of new STUT tokens to be created.

II.4.4. Creation of New STUT Tokens

The amount of new STUT tokens created comes from the equation that gives us the amount of STUT tokens added to the pool as

$$\Delta S = (1 - \gamma)\ \lambda \Delta P S$$

Where γ is calculated as seen in the previous section:

$$\Delta S = (1 - \frac{\sum_{i=1}^{M} min[0.2,\ 0.0125(3\frac{t_i}{t} + 1)] * s_i}{\lambda \Delta P S}) * \lambda \Delta P S$$

$$\Delta S = \lambda \Delta P S - \sum_{i=1}^{M} min[0.2,\ 0.0125(3\frac{t_i}{t} + 1)] * s_i$$

Where:

- λ is the percentage of the loss of STUT tokens in the pool to be recovered: 0 if the loss has left over 70% of the STUT tokens in the pool, 1 if the pool falls below 30%, and a number in between in any other case.
- ΔP is the increase of the percentage of STUT tokens in the pool during the period.
- *S* is the total number of STUT tokens in the system.
- *M* is the number of inactive users, with a user being considered inactive if a certain period of time has passed without interacting with the system, t_i, bigger than a given t, whose value is determined through the churn rate of the platform. Each of these users has an amount s_i of STUT tokens.

These new STUT tokens created allow us to update the total number of STUT tokens in the system

$$S_1 = S_0 + \Delta S$$

Which will be used to determine the percentages for the next period.

By using economic metrics to issue new tokens, we can make objective decisions, thus conditioning the creation of new tokens and the following inflation to the health of the platform itself.

An increase in the activity and value of the platform and a high retention of the most valuable students and teachers in the system will give us a low value for γ, with many valuable contributions to the community. This will create a high level of demand in the system, with the relevance earned by the users keeping its absolute value but being worth less when considering the total number of users. As a result, the level of excellence needed to be relevant in the system will increase, with more effort and value needed due to the demand in the token quantifying it.

On the other hand, a decrease in activity and a high level of abandonment among the users will give us high levels for γ, lowering the amount of new tokens issued and rewarding those users loyal to us by stabilizing their positions in the STUT array.

II.5. Initial Distribution of STUT Tokens

The initial issue of STUT tokens is ten times the number of TUT tokens issued. 10% of these STUT tokens will be distributed among the students and teachers within Tutellus, currently numbering nearly a million users.

This distribution will be done according to the educational value contributed by the user to date, as measured by the activity in the system. Each user in Tutellus has a value of activity, measured by a system implemented over two years ago, to measure the educational effort. To date, this activity metric has been used to identify the most valuable users of the platform, and it is now possible to reward these value-bringing users thanks to the monetization of the platform.

This activity metric lacks the level of detail of the STUT token. Each user is associated in our database to a set *k* of skills, either by expressing interest in the topic, or by getting products, free or paid, associated with the skill. User relevance in the system is currently measured by the activity metric, which is not segmented by skills, but rather is a constant along the array of skills

$$[a_1, a_2, a_3 ... a_K]$$

We obtain a position in the array of activities associated with the skills, for every student and every skill which allows us to compare between students.

$$[\omega_1, \omega_2, \omega_3 ... \omega_K]$$

Let *B* be the initial number of STUT tokens to be distributed to current users. For every skill *h* in the platform, we count the users that have either tagged the skill as an interest, or have shown interest in the skill by finishing a course associated with it. Thus we get an array of number of students by skill

$$[n_1, n_2, n_3 ... n_H]$$

Where the sum of these values is greater than or equal to the total number of users, since each user can have multiple skills. The share of STUT tokens among these skills follows a proportional distribution, so the amount given to the skill *h*, b_h, is

$$b_h = \frac{Bn_h}{\sum_{i=1}^{H} n_i}$$

This amount is distributed among the n_i users associated with the skill, again following Zipf's law, thus rewarding in a significant way the biggest contributions while making sure every contribution has, in some way, been rewarded. For this process we use the position of the user ω_k inside the relevance array, with the total amount of STUT tokens per user and skill being expressed as

$$G(STUT)_k = \frac{Bn_k}{\sum_{i=1}^{H} n_i * \omega_k * [LnA_k + 0.5772 + 1/2A_k]}$$

Where A_k is the number of students with activity greater than zero in the skill. The total amount given to the user in the initial share of STUT tokens is then

$$G(STUT) = \sum_{k=1}^{K} G(STUT)_k = \sum_{k=1}^{K} \frac{Bn_k}{\sum_{i=1}^{H} n_i * \omega_k * [LnA_k + 0.5772 + 1/2A_k]}$$

With an initial array of STUT for the *K* skills

$$[G(STUT)_1, G(STUT)_2, G(STUT)_3, ..., G(STUT)_K]$$

Which provides us with the values used to quantify a user's initial relevance in the system.

Tutellus

Empowering people through Education

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