Luunja Secondary School

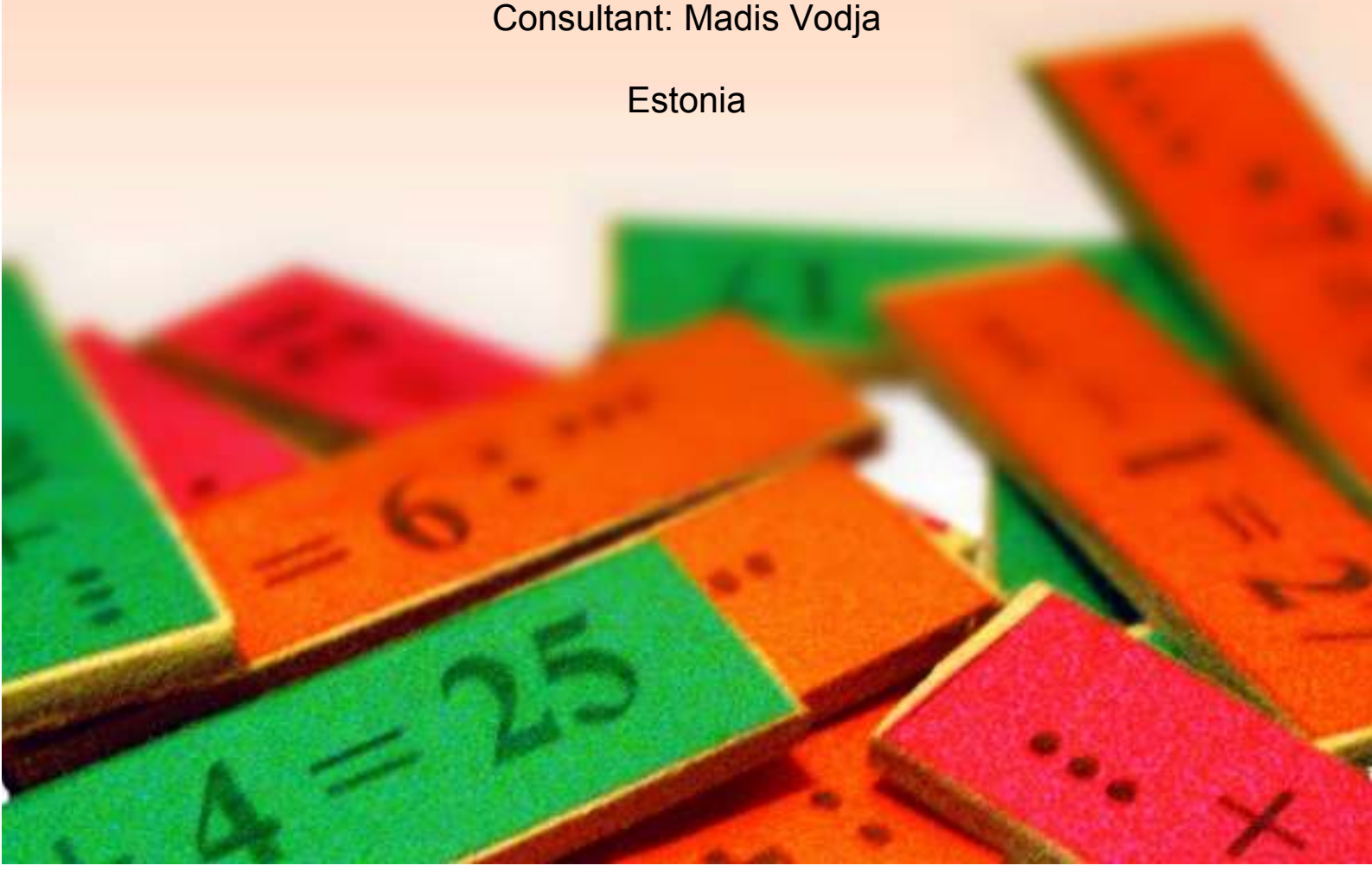
Student Company

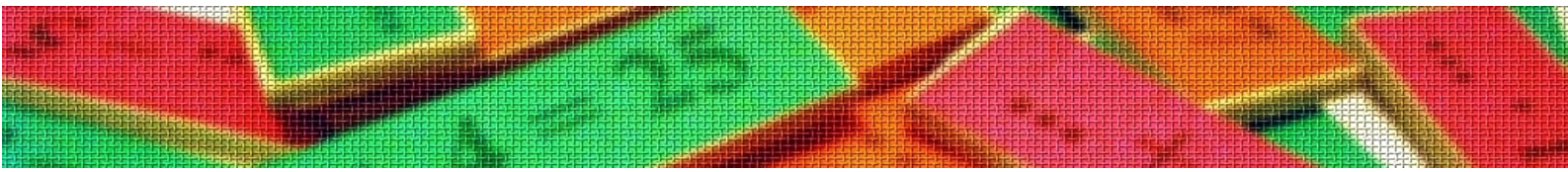
MathEco

Final report
2008

Teacher: Ülle Tõnutare
Consultant: Madis Vodja

Estonia





EXECUTIVE SUMMARY OF STUDENT COMPANY MATHECO

Mission Statement:

To commit into turning our country (also Europe) towards Innovation and Science Based Economy by making learning more fun and interesting for children.

Product

Matheco produces educational dominos for children. Our main product is a mathematical domino with equations on them but recently we have expanded into language dominos as well.

Summary of Financial Results

Turnover	1.207,40 EUR
Profit	780,90 EUR
Profit Margin	64,7 %
ROI	2603 %

Summary Statement of Company Performance

Matheco's performance was successful. All goals were achieved. The product – mathematical domino - was popular and caught interest of students, parents, teachers and Ministry of Education. It is protected in Estonian Patent Office as an Industrial Design Solution. We were happy that we found a gap in the market of educational games. Our game makes learning easier and much more interesting. After intensive product development we also started to produce language dominos. We plan to start our own company already this year.

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Name

Our student company is called Matheco. It means “Mathematics into Economy”! With this name we wanted to emphasize the need for learning math as a basis of any technological invention and innovation that is so necessary for development of Estonian (and also European) economy. In this fiercely competitive world Europe needs to do it’s best in order to compete in world economy. We believe initiative needs to be taken on a grass-root level and everybody needs to pitch in to achieve this goal.

Slogan

Math Is Cool, Learning Fun!

How It All Started

Our student company was created inside our school economics program. In our school economics is an obligatory part of school curriculum and all students in upper secondary school have to go through the student company program. This is in part the reason why we chose Luunja Secondary School when deciding between different schools two years ago. The school had had the student company program already for nine years and we knew that there is an enthusiastic teacher Mrs Ülle Tõnutare to facilitate the companies.

We formed a team of people who did not have the same thinking but a similar attitude towards life and basic values. It was quite easy to do it as we had already spent a year together. The life in the student company demonstrated that the basis for forming a team was a right one – we got different people but it was still possible to find common solutions as our goals and objectives were quite similar.

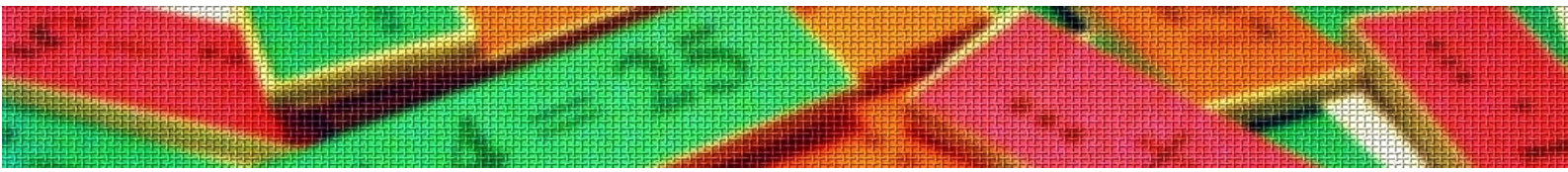
So at first we had a Team.

Finding a Business Idea

As we already had the team we started to look for a business idea. We gathered our team and started to brainstorm. We decided to use the model Problem- Reason – Solution - Product/Service.

We began with listing problems that needed to be solved. We got a pretty big list and from there we chose almost unanimously the problem that Estonian (but we knew that also in Europe) more young people go to study “soft” subjects and not technology. Job market of specialists in soft sciences is more than full but there is a lack of good engineers, technicians, IT-specialists, etc. After re-independence Estonia has been looking for its own way and we all found that it could be in some innovational technical product or service. So- technical subjects must become more popular. Another problem branching off from this major one is that women tend to find social sciences even more appealing than men. The vast majority of science students in Estonia are men and the same trend applies for the whole Europe.

When we started to find out the reasons, again by brainstorming, we came to the conclusion that the main reason is that young people are not interested in mathematics in school time. They find history, social sciences, languages more interesting and – easier to study. As we remember from our lower secondary school (about age 11-12) the interest towards mathematics – the basis for learning physics and chemistry and



equally important in biology and medicine – tends to fall at this age. We found that the main reason for this is too academic teaching and learning of Math at school.

We brainstormed again to find a product or service to solve this problem. We had different ideas how to promote learning Math in an early age. One of them was tuition – older schoolmates helping younger ones. Then we thought about different learning tools with formulas but it has already been done by student companies in Estonia before. The first brainstorm ended without a particular idea.

We even thought about quitting this concept of a learning aid and producing something more usual as lamps, bottle-clocks, armlets with a clock, rings with clocks, etc.

However, a couple of days later our company's Creative Manager Olavi Ala visited toy shops and observed games there. He saw only a few educational games but nothing for training mathematical skills. Then he noticed a domino game and suddenly he had an idea – a solution to our brainstorming. He suggested us a mathematical domino: pieces of wood with equations on them so that the end of one equation is the beginning of another. Players have to match pieces together in a playful and sportive way. We discussed the idea in our group and everybody liked it. To be absolutely sure we did a short market research, asking from teachers and parents of young children if they would consider buying such a product. People warmed very quickly to the idea so that it was.

So next we had a Business Idea.

Mission, Vision, Goals

The next thing was to write down what we wanted to achieve as a student company. We started with defining our **Mission Statement.**

We found that our **mission** was:
To commit into turning our country (also Europe) towards Innovation and Science Based Economy by making learning mathematics (a basis of technological innovation) more fun and interesting for children.

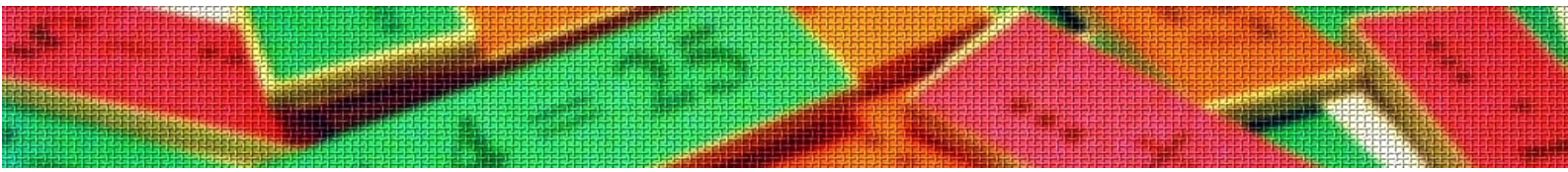
When the time passed and we developed our product we redefined our mission into a broader one. We still focused on Science Based Economy but started to speak about learning for fun and embracing other subjects. So our redefined **Mission Statement** is**:**

To commit into turning our country (also Europe) towards Innovation and Science Based Economy by making learning more fun and interesting for children.

Agreeing on **Vision** was much more complicated. As the lifetime of a student company is limited to one academic year we could not think much of our future as a student company. We defined our **vision** outside a student company:

In ten years we will have a real functioning toy company producing educational games for Estonian market but also for neighboring countries. We will have agreements with our Ministry of Education who suggests these games for using in classrooms as complementary learning tools.

When listing our **Goals** we discovered that they were similar for almost everybody. We all listed our personal goals and then we put them



together and added some more ones that came out from synergy.

The goals that we agreed for the student company were the following:

- To obtain skills and knowledge in entrepreneurship
- Learn teamwork, develop communication skills and responsibility.
- To promote learning math as a basis of technology and innovation
- To prove that it is not so difficult to understand math if the interest is awoken towards it .
- To satisfy the self-actualization skills of our customers.
- To raise the interest in math in girls and to open new career choices (engineering, technical jobs) also for them.
- To make profit by filling the gap in the market.
- To have fun.

As the result of these steps we new at least what we wanted to do and we had some hope that everybody in the team shares this vision.

Organisational Structure

The next thing to do was to decide Who Does What.

We started drawing our organizational structure from making a list of all works we had to do. Then we grouped them into clusters and decided about the necessary jobs.

It was not the easiest task as we did not have experience in working in companies. For understanding the necessities of a student company we studied textbooks and spoke with real companies. Also our teacher Mrs. Tõnutare was of a great help. However, we decided that if there was a need for fulfilling extra jobs not planned into our structure our Executive Director will make the decision or in case of a larger field of responsibilities we decided to gather as a team and make changes into the whole structure and allocation of functions.

Dividing functions among ourselves was already quite an easy task because we had known each other for a year. When allocating tasks we considered our own personal strengths but also our future plans and willingness to develop in some special area. After this work the company structure was set to be as follows:

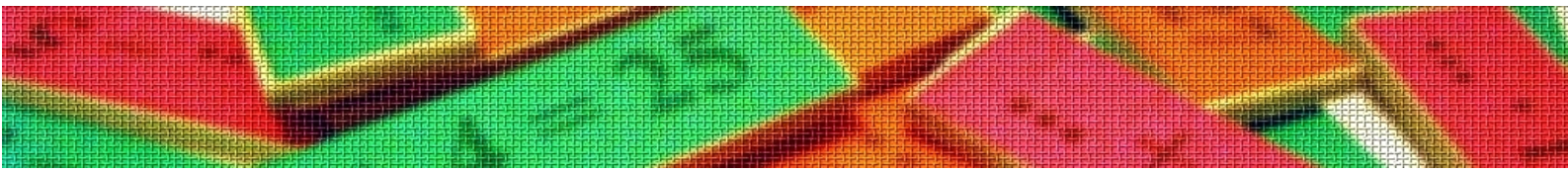
Elin has analytical thinking. She is good in making decisions and ready to take risks. At the same time she is a very responsible person. She was elected to become our **Executive Director.**

Olavi was the one who got the business idea. He is very creative and has atypical thinking. At the same time he is a bit shy. He became our **Creative Director**

Eva pays much attention to the quality of things and wants everything to be done in time and in a right way. She was elected to become company **Production Director**.

Ahti is enterprising and creative. He is a good communicator and knows how to explain things. We found that he was a good person for a position of the **Marketing Director**.

Even is good in math and is very systematic. He is very responsible.



You can always trust him. He became our **Financial Director**.

In addition to the members of the student company we had our **teacher Ülle Tõnutare**. She is experienced, not over protective but always reliable and of a good support. Later **Madis Vodja** also joined the team as a **business advisor**. His function was to help us to understand how things work in real business.

We consider our good relationship and mutual trust to be our greatest advantages. We had different opinions but we think that it was a great asset: creative ideas and good solutions often come from discussion.

After defining the jobs we also wrote **Job Descriptions**. It was not a very easy job and when we closed our student company we found that we had added many things to the job descriptions during the lifetime of the company. And what we learned from this experience is that in life and business you always face things that you have never planned and one factor of success lies in handling such kind of surprises efficiently.

SWOT

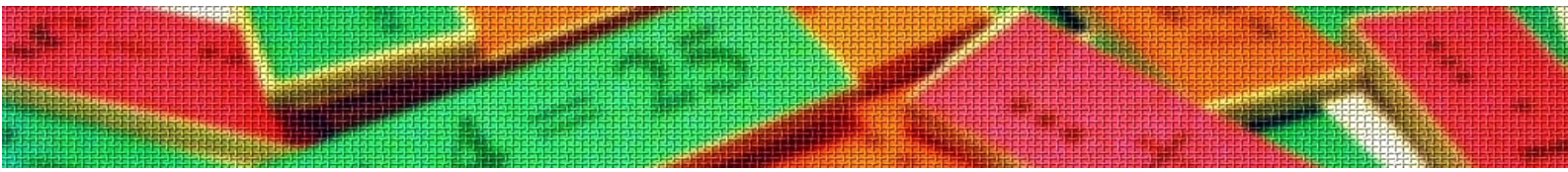
Before we started our activities we drew a SWOT analyses for our company and for the product. We assessed our strengths, weaknesses, opportunities, and threats. A proper SWOT is completed only after dealing with these factors and so we tried to find ways for decreasing threats and overcoming our weaknesses.

We wrote down the following **Strengths**: a **developing product** which allows us to create different versions and levels of the game; **universal product -** language borders were no problem since math is the same all over the world. We also counted **social responsibility** (addressing a problem that is real and urgent in society), **environmentally friendly production** (the materials we use are mainly industrial leftovers), need for a **slender basic capital** and **good teamwork** to be our strengths.

The main **Weaknesses** were pointed out as: **quality** of the product (we are not experts in producing the domino ourselves), **not enough resources** for further investments, **small productivity**, a **small market** and the shortage of **time**. Time deficit was the only thing we couldn't do much about, since we are still studying in school. We could increase the quality of the product over time and improve productivity with new production methods. Resources for further investments remain as a weakness but we are working on solving it.

Opportunities were found to be accessing **new markets**, **wide interest** towards math, external **investor** and becoming an official **study material** in schools. We have already grabbed one opportunity: our dominos are under discussion for getting into use as a complementary study material at school. We are well aware of other opportunities and we are trying to seize them as a real company.

Major **Threats** were considered to be increasingly **low popularity of science subjects** in Estonia and in Europe, world-wide **economical recession** and **increasing competition** from similar educational games. We found that our main



threat was **copying our product** by other actors. To avoid it we registered our product in Estonia Patent Office. Other threats are currently out of our hands but we try to minimize the risk with careful planning and cost-efficient operating procedures.
The SWOT analyses increased our self-confidence to produce our mathematical domino.

Initial Capital

To get initial capital we invested our own money, the contribution of each company member was about 6 EUR – so we invested into initial production 30 EUR. It was a single investment since later production was financed by our sales.

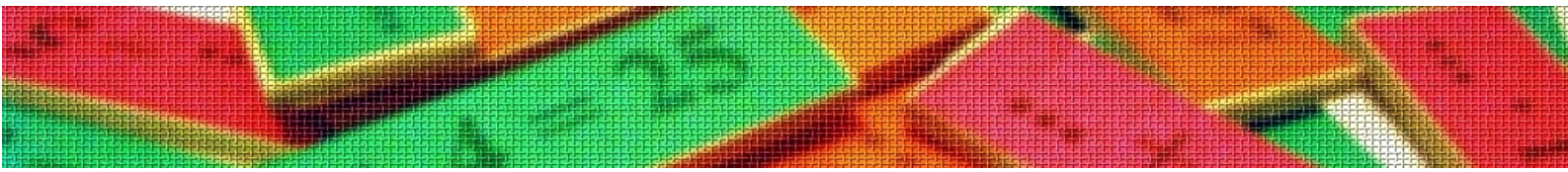
Product Description

Our product is an educational domino game. Initially the *mathematical* domino was our only product. It works as a regular domino game: you have to match one end of a domino stone with another piece that has the same beginning. With our version one end of the domino stone has an equation and the other end an answer to another equation. It has various levels of difficulty:

- First age group is **4-6 year olds** – pictures with adding and subtracting printed on domino pieces
- Second age group is **7-8 olds** – A more complex set of subtraction and adding operations, the pictures have been replaced by numbers
- Third age group is **9-10 olds** – Adding, subtraction, multiplication and division operations are printed on the domino stones
- Fourth age group is **secondary school students** – domino is more complicated including fraction numbers, square root, etc operations

The game includes an instruction manual and an answer sheet with all possible outcomes. The answer sheet enables children to play the domino alone as a study exercise.
As a product development we decided to widen our product range to *language* dominos. You have to match the word in one language on a domino stone with the equivalent in another language on another stone. Since this particular product is still in development stage we only have one difficulty – for beginners. We have five different versions: **Estonian-English**, **Estonian-German**, **German-English**, **Swedish-Estonian** and **Swedish-English**.

We plan to try **chemical domino** next but we are still working out the equations on it.
As we have two different target groups – schools and parents – we decided to produce the dominos in two different versions – "**regular**" for homes and "**premium**" for schools. As a child does not play the domino forever without getting bored we produced cheaper "regular" sets for homes made of laminated cardboard. More expensive and durable "premium" sets from wood are produced for schools where different children play them every year.
Since we had a very large range of products: 4 mathematical dominos, 5 language dominos and of each of those two different versions – regular and premium. To solve the problem of confusing different products we had to pay much attention to box



designs. Different dominos had different package label signs and colors, the simpler dominos for younger age groups had a more playful design to appeal to them.

Product Development

During the lifetime of our student company the product has developed a lot. Initially the product was black-and-white, later we started to produce it in color to make it more interesting for younger children. We also improved the packaging. Initially packages were white, large and unwieldy but later we replaced them with smaller and more colorful ones. New packages are easier to carry and also more pleasing to the eye.

Production

Production of "premium" sets is more difficult. In the beginning we did everything ourselves. We cut a large plywood sheet into pieces of and sanded them. This was not an easy job for two reasons: first, the cutting takes a long time. Secondly, since we use **industrial leftovers** that are much cheaper to buy and more environmental-friendly, then the larger pieces are all in different shapes. Preparing of these large pieces took us additional time. Then equations were printed on paper and glued on the pieces. The final product was packaged in home-made packages. Right now cutting and sanding is done by a furniture company Sarkop in Tallinn, also the printing is outsourced. "Regular" sets are being printed out of the printer and then laminated.

Study Material

We have applied for recognition as a "supplementary study material" in the Estonian Ministry of Education and Science. The experts will gather at the beginning of the school year of 2008/2009. The initial responses from the ministry have been surprisingly positive. A ministry official told us that it is an "alternative in elementary school for teaching mathematics" and could "yield great results when propagating science in school".

Protection of our Product

Our mathematical domino is protected by Estonian Patent Office. The application was submitted on February 20th, 2008. The product is protected as a solution of industrial design.

Quality Control

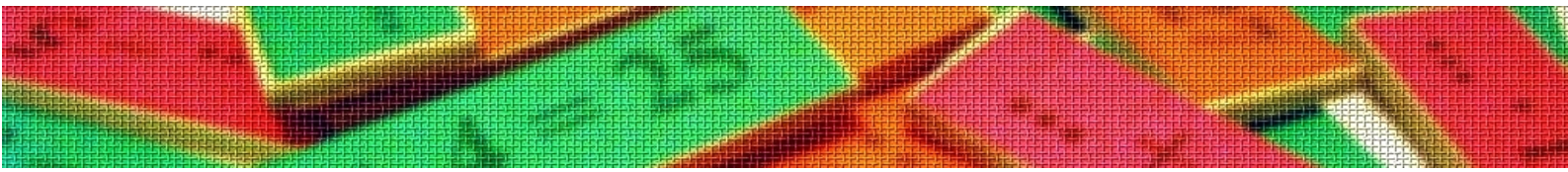
We paid extra attention towards quality. We all tried to make high level production and checked our own work but also our Production Manager checked each and every set we sold. After the prototypes for each type were produced we tried every possible way to break them. Only after satisfactory results we started larger production.

Guarantee

As we were quite confident in the quality of our products after the extensive testing we offered a guarantee for 6 months as it is with real companies.

Marketing and Sales

MathEco got their first experience at the school fair. Students and teachers who were our first customers tested the game and gave good feedback for product development. From that fair we got a positive boost for further action because the product received a



warm welcome, especially from elementary school teachers.
From that on MathEco has sold its product at most student company trade fairs around Estonia. We sold 92 regular and 17 premium sets there. As premium sets were meant mainly for schools and kindergartens, we had to implement a different sales strategy. We made product presentations in our own and in nearby schools and kindergartens. This way we managed to sell 37 "premium" sets for different age groups.
In addition to several trade fairs we attended training seminars organized by JA Estonia, JCI and JA alumni organization SENT. We also consulted with entrepreneurship experts. This will no doubt come handy when we start a real company.
Our future marketing plans also include a dual strategy: first and foremost we want to sell at big toy-stores and malls. The success at selling personally in schools has led us to believe that we cannot forget about this market segment. We plan to carry on with the personal presentations at schools and educational fairs. We want to market our product firstly in Estonia and later in nearby countries. We believe that the same challenges that Estonia faces and that have made our product a success are the same all over Europe.
We have also drawn a web page where customers could get more information about our product and ask questions from us, or just get a contact. Plus, it is also a good way to advertise the product. The address is **www.matheco.hyena.pri.ee** We haven't got an experience though to launch a "web-shop" yet. These are quite popular in Estonia so it is a "must" in later company operations. We consider the lack of IT knowledge to be one of our main disadvantages.

Pricing

We had two different price groups: one for the "premium" domino and other for the "regular" one. Production of the "regular" set was much easier and also cheaper. The cost of printing, cutting, laminating and packaging of one game set is approximately 1,20 EUR. It stayed almost the same for all production time as the production process stayed pretty much intact for the whole year.
Production of "premium" sets changed quite substantially over our operating time. At first we sawed the plywood and glued the equations on pieces ourselves. The efficiency was quite low and we were not satisfied with the quality. Now we order cutting from a furniture company. Cost has not increased as we don't have to pay our own members for production anymore. The cost for one "premium" set is currently at 2,30 EUR.
At the first trade fair we were not very sure that our product was going to sell well – customers were mainly teenagers of the age of 14-18. So we set the price for the "regular" set at 3,20 EUR and the "premium" for 5 EUR. We implemented the well-known concept of "9". The regular set was sold for 3, 14 EUR (49 EEK) and premium for 5,05 EUR (79 EEK). As all of our sets were sold really quickly we decided to raise the price for next trade fairs. Currently a "regular" set costs 6,30 EUR and "premium" 12,70 EUR.

Financial Results

Profit and Loss Statement
October 01, 2007– June 12, 2008

		Actual	Business plan
Income			
1. Sales Income		1.207,40 EUR	319,40 EUR
Costs			
2. Production costs			
	materials	165,20 EUR	105,00 EUR
	wages	73,00 EUR	36,40 EUR
3. Sales			
	stand	35,00 EUR	21,20 EUR
	wages	153,30 EUR	92,30 EUR
Profit		**780,90 EUR**	**64,50 EUR**

Balance Sheet June 12, 2008

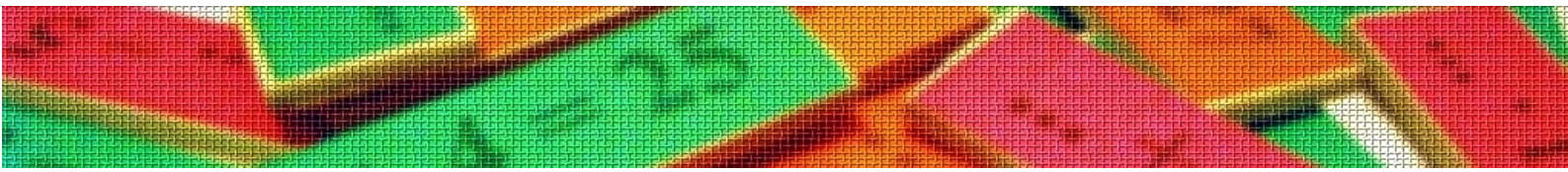
Assets			Liabilities and Owners Equity		
	Real	Business plan		Real	Business plan
1. Cash	789,80	97,40	1. Share capital	31,90	31,90
2. Products	23	0	2. Profit	780,90	65,50
3. Fixed Assets	0	0	3. Liabilities	0	0
TOTAL	**812,80**	**97,40**		**812,80**	**97,40**

Summary

We believe that we have accomplished all our short-term goals! We have produced and marketed a product that has arisen interest in children, parents, teachers and even in the Ministry of Education and Science. We have understood the basics of entrepreneurship, we have earned profit, we have had fun, we plan to start a real enterprise.

In addition to that we have taken a big step towards achieving the more abstract, long-term goals. We hope that our activities have promoted learning mathematics and learning in general, we have satisfied the self-actualization needs of our customers and proven that mathematics can be easy and fun.

The company process was not a spotless success story, but a road that was sometimes bumpy, sometimes equally smooth. We have learned to embrace the difficulties – there are no “problems”, there are only “interesting situations”.



What We Have Learned?

We have learned much from our student company but also from the experiences of other companies. We have learned teamwork! We understood that everybody needs to know that he/she is important for the company, yet everybody needs to value his/her own responsibilities.

We have learned to spare resources: time, money, materials – we didn't have too much of any of those. We managed to plan ahead and overcome these issues. We have developed our communication and sales skills. We learned that you can't quit at the first site of a problem – you need to push forward even if it's difficult. Only that way you can achieve success.

We have learned how a company works – how to pay wages, calculate turnovers and organize activities. We have practiced creativity. Developing our product and finding new ideas was one of the most challenging experiences with Matheco.

Company's Future

Our real future starts now! We have been looking for an investor, for a means for mass production and for retail shops for a few months now. We plan to "shift in the next gear" straight after the student company competition. We'll have more time to dedicate to our larger business goals then.

We plan to improve our product further. No product is ever perfect; there is always something to improve. We have talked about the possibilities to enlarge our product range to physics, chemistry, biology but also synonyms, different language packs, history, etc. We truly believe that the possibilities for fun learning with the help of our domino are endless. And domino is not the only option! This is the reason why we have decided to create our own real company that produces fun and educational games for children. We have already 1/3 of the necessary starting capital from our own profit; the rest should come from an investor. The end of Matheco as a student company is not the end of our business, it is only the beginning!

Acknowledgements

We would like to thank our school for great support
We are grateful to our teacher Mrs. Ülle Tõnutare and our consultant Mr. Madis Vodja for their time and advice.
We appreciate highly Anne-Mari Rannamäe's good advice for protecting our product in the Patent Office.
We are thankful to Sarkop, who has been a great partner for us.
Thanks to all of our wonderful customers who believed in us and our product!
And last but not least: we are very grateful for Junior Achievement Estonia for this wonderful program.