

Inverted Classroom setting using a mobile app for change management processes.

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Abstract

The aim of the research work is to gain knowledge about the optimal design of courses. The division of the materials into e-learning and presentation are varied and success measured by the results of the simulation game.

The poster demonstrates an exercise, which uses a mobile app for Production Planning and Control. This exercise can be used for teaching and training competences connected to orders, purchase, production, selling and quality management connected to accounting processes, like billing and turn-over calculation.

The game starts with a first round, which is played with given organizational rules. Usually there is a loss because the flow of information from the customer to the production is too slow. The second round begins with a reorganization of the entire production. An optimal production process makes it possible to generate profits for the company. The students learn to optimize processes and apply them in the game. The game is played four times per semester with different groups and allows the comparison of the results. In some groups, e-learning is used very intensively, in other groups knowledge is conveyed only through lectures. The comparison of the results of the game allows a conclusion on the optimal use of e-learning.

Introduction

Inverted classroom settings (inverted classroom is an instructional strategy that reverses the traditional learning environment by learning fundamental content, outside of the classroom) like this game, replace traditional homework (for example: developing concepts for business process). The resolution of the game and the final feedback session is done in the classroom with the guidance of a mentor.

The production of e-learning units is very time-consuming and only meaningful for large numbers of students. This course teaches business process optimization. For several years, there is a standard for BPMN 2.0 (Business Process Model and Notation), which is used by many companies. Manufacturers of modeling software have a great interest in promoting their products and therefore provide e-learning videos for free. This gives students the opportunity to watch high quality educational videos anytime.

The basics of process modeling can be learned very well with e-learning. Application examples are practiced in the seminar room. The application of self-created processes in the game provides the in-depth knowledge about the dynamics of processes. This is also reinforced by the very different order quantities and times.

The delivery time for an ordered car is set to 5 minutes. This can only be achieved if the entire process is optimally designed. By calculating the profit / loss for the company, the ambition of the students is promoted.

The use of the production planning and control software on the smart phone / tablet is very well received by the students.

Materials & Methods

Methods

The game uses cars that are very easy to build together. The assembly is divided into three workplaces. The workplaces receive instructions from production planning, but this department has no information about the expected order quantities. Production usually starts in the first round only after the arrival of customer orders (the delivery time is therefore not achievable). After the assembly, a quality control is carried out, then the packaging and delivery to the customer. A warehouse provides on request the components for the cars. An accounting is managed via an excel table.



"Speedster"



"Roadster"

The work instructions of the first round are very cumbersome and trigger many ideas for improvement. Before the start of the second round of play, students can change the entire organization and also arrange the workplaces in the room.

In the second game round, the customer orders 50% more cars than in the first round. With the improved organization almost all groups manage the timely delivery of all ordered cars.



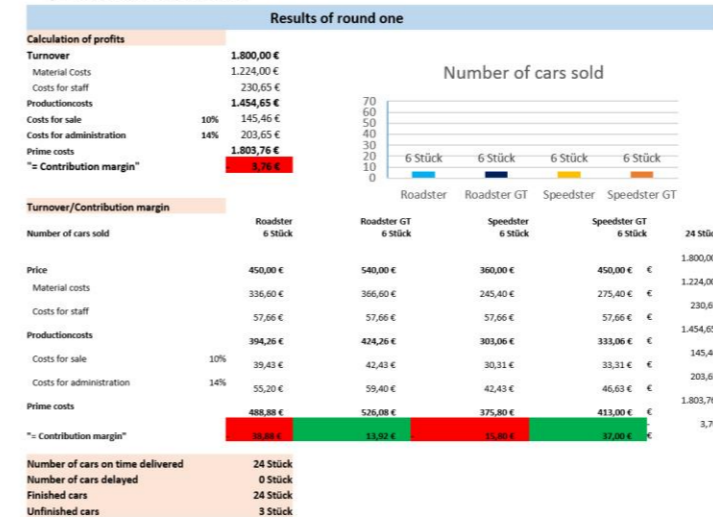
Classroom

Participants

The game is played with students of business administration, participants in postgraduate courses (change management and lean management) and company employees. This allows a comparison of players with practical experience with students who have mostly no experience in business..

Results

The results of the game rounds are measured in accounting and production statistics.



Calculation of profits

Management game of Krickl GmbH

Statistics

Home Statistics Workstations Logout

ordered Cars: 62

Punctually delivered cars: 57

Punctually received cars: 52

| Order number | Serial number | Production time | Throughput time |
|--------------|---------------|----------------------------|-------------------|
| 60 | 1025 | Speedster GT Hellblau Gelb | 00:02:51 00:03:01 |
| 59 | 1015 | Speedster Hellblau Rot | 00:03:09 00:03:21 |
| 58 | 2025 | Roadster Gelb Gelb | 00:02:35 00:02:41 |
| 57 | 1027 | Speedster Hellblau Rot | 00:02:56 00:03:07 |
| 56 | 2003 | Roadster Gelb Rot | 00:02:53 00:03:12 |
| 55 | 1012 | Speedster Violett Gelb | 00:04:35 00:05:13 |
| 54 | 1025 | Speedster GT Violett Gelb | 00:04:45 00:05:17 |
| 53 | 1026 | Speedster Hellblau Rot | 00:04:16 00:04:32 |
| 52 | 2022 | Roadster GT Gelb Rot | 00:03:42 00:03:49 |
| 51 | 2024 | Roadster GT Gelb Rot | 00:03:12 00:03:28 |
| 50 | 2015 | Roadster Gelb Rot | 00:03:07 00:03:29 |

Screenshot "Statistics"

Management game of Krickl GmbH

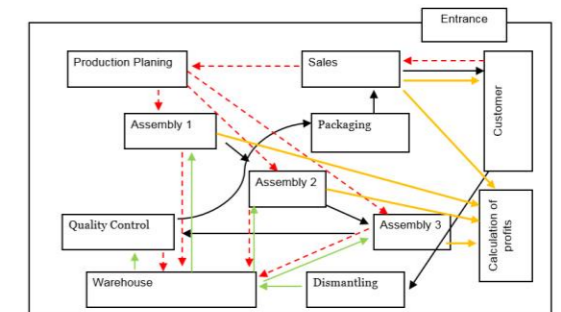
End of production line

Home Statistics Workstations Logout

| Order number | Serial number | Car type | Tire color | Screw color | Order time |
|--------------|---------------|-----------|------------|-------------|--|
| 61 | 1234 | Speedster | Hellblau | Rot | 14:05:43 <input type="button" value="Done"/> |
| 62 | 123 | Speedster | Hellblau | Rot | 15:29:24 <input type="button" value="Done"/> |

Screenshot "Information for the workplace"

The method of the inverted classroom is evaluated very positively by the students. The learning success is clearly recognizable, as the students have to deal intensively with the modeling of processes. The dynamic run of production processes are very clearly experienced as the customer orders very different quantities. Furthermore, the use of production planning and control software conveys very well how important it is for the flow of information to be quick and error-free. The increase in productivity from the first to the second round gives the students knowledge about the importance of process optimization.



Arrangement of work tables for round 1

Conclusion

Advantages of the INVERTED CLASSROOM MODEL

In the INVERTED CLASSROOM MODEL, time is used more effectively for discussions with other learners, as knowledge of lecture recordings already developed can be discussed. Learners thus have the opportunity to consolidate or deepen their knowledge by directly applying knowledge together to solve problems. In addition, ambiguities can be eliminated together.

The INVERTED CLASSROOM MODEL sets the learners' ultimate goal, but they can choose their own pace of learning and learning strategy. If necessary, recordings may be paused, repeated, or additional information may be gathered through self-initiative, such as through online research or looking up a textbook. Thus, each individual person, depending on the type of learning, can use the most conducive materials for additional learning and understanding of the content. Furthermore, the recordings can be viewed several times, it can be pre-worked or reworked in stressful phases.

In contrast to traditional learning methods, the INVERTED CLASSROOM MODEL focuses on the learner rather than the lecturer, gaining control and responsibility for their own learning process. In addition, learning content can be consolidated by learners explaining each other's content.

Once created digital learning materials are recyclable, content does not have to be recited. In addition, events with similar content can be adapted with little effort, for example by using the same materials, but the presence events and assignments are prepared for specific target groups and courses.

Further advantages would be additional support in the exam preparation, the possibility, in addition to the classical methods of calculation with paper, pencil and calculator, additionally practical commercial functions such as e.g. in Excel or incorporating current (business) topics.

Bibliography (Examples)

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