Didactic Conception

PIA2
PROJECT

INSTITUTE TECHNOLOGY AND EDUCATION IT+B INSTITUT TECHNIK UND BILDUNG

Universität Bremen

Lifelong Learning Programme

This project has been funded with support from the European Commission. This publication [communication] reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

Teacher Handout

The following handout aims to support teachers in the introduction and implementation of the project management method in their classrooms. The guideline “Project Management: Setting the Standards in Schools” is based on the following explanations.

Authors:
Michael Gessler
Andreas Sebe-Opfermann

Version:
July 2014

This project has been funded with support from the European Commission. This publication [communication] reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

Content

This project has been funded with support from the European Commission. This publication [communication] reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

1 Introduction

Based on the concept "Project Management: Setting the Standards in Schools" students gather basic skills in applying the project management method during a course with a total **duration of 30 hours**. Besides getting acquainted with the basic knowledge of project management (PM), the students acquire skills and competences along with developing values that are necessary in the completion of projects. A **project** in the sense of this conception is characterized by the following features:

1. **Learning Experience**: A project within the school-context should always enable students to gather learning experience. Knowledge and action are *linked*: Knowledge acquisition needs to end up in the *experience of action* (practical application), the same as experience of action needs to end up in *knowledge acquisition*. Learning experiences result only in the linkage of knowledge acquisition and practical application, and vice versa, whereby practical application derives from knowledge and knowledge derives from practical application. In our understanding, projects without learning experiences are no projects.
2. **Problem, Project Order, and Client**: Origin of a project is always a problem related to a vocation which is formulated like a request. A *vocational problem* implies that at least at the beginning of the project it is unclear what goal exactly should be reached and how to solve the problem. A *project order* means that the vocational-related problem "belongs" to someone who as an interest in the solution of the problem. We call this person a client. Characteristic of vocational-related problems is that there are several ways of solving the problem resp. that there is space for solutions. Projects without a vocational problem, without a project order, and without a client are not projects in our understanding.
3. **Project Team and Team Work**: Project orders are given from a client to a project team. From that moment on, the project team is responsible for the solution of the vocational problem. The project order has to be complex and demanding so that *cooperation* between the students is needed. Projects that do not need cooperation within the project team are not projects in our understanding.
4. **Project Context (e.g. stakeholder)**: Projects are always situated in a specific context. Part of the project context are groups of interest (stakeholder) which are either directly affected by the project or which have an interest in the project. Along with these social parameters, there are others, such as cultural (e.g. norms), factual (e.g. laws), and immaterial parameters (e.g. background of a project). Projects without a context are not projects in our understanding.
5. **Limitations (time and resources)**: There are always limitations within a project. *Time*: Projects have a defined start and a defined end. *Resources*: Projects always work with limited resources. The limitations hamper the problem solution. Projects without limitations are not projects in our understanding.

Project Management-Method resp. PM-Methodology. With the present conception we intend a *cooperative problem solving process* that enables *learning experiences*. Here, we speak of a PM-methodology and not of a PM-method. Project Management is not *a method*, but an *overarching methodology* that connects several methods (e.g. team work, moderation, presentation). In these kinds of projects within schools, students are being confronted with open spaces to act

This project has been funded with support from the European Commission. This publication [communication] reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

independently. At the same time, they are being equipped with the essential know-how, methods, and experiences to use this freedom productively in their teams.

The application of project management in the pedagogic context of teaching projects is an independent didactical conception which fosters problem-solving, self-organization, and cooperative learning as its central ideas. “Project-teaching” from this point of view ties to John Dewey’s idea that rates the value of knowledge on its usefulness, which it has for the human beings’ actions and way of living. Teaching and learning processes are therefore not to be reduced to a “diet of predigested substances,” but are supposed to convey learning experiences, that are supposed to open up the room for further experiences. In order to avoid misunderstandings that might result from **different** pre-experiences of students, the following differences should be clarified **before the project begins**.

- Project management is not a new teaching-method, but a package of interconnected working methods, that have been applied as a standard feature for a long time in contexts such as the economy and the sciences.
- The Project management methodology is being applied, if the problem is too complex to be solved by an individual alone in a specific period of time, and if the expertise of different disciplines resp. vocations is necessary.
- The beginning of a project is not a (teaching) topic, but always a vocational problem, for which the students need to find a solution and which is formulated like a project order. The project acquisition can be done by the students or the teacher. Before the project starts, framework conditions within the school have to be clarified and first agreements on how to integrate the project in the student’s regular schedule. Helpful, but not always possible, is to stop the regular schedule during the project’s duration.

Part of clarifying the framework conditions are agreements about the **documentation** and **evaluation** of the project work. The documentation of the project is basically made up of two components:

- **Project Journal:** The students document the working and learning process of the team. It simplifies the resumption of the planning activity by periodic interruptions and allows retrospectively the self and external assessment of the each working step.
- **Project Management Documents:** They are produced during the project work. Their structure is mostly given (e.g. stakeholder analysis, goal matrix). They differ, however, in their specific design which depends on the project and the approach.

A separate document had been worked out concerning the **evaluation of the student’s performance** which may become very complex.

This project has been funded with support from the European Commission. This publication [communication] reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

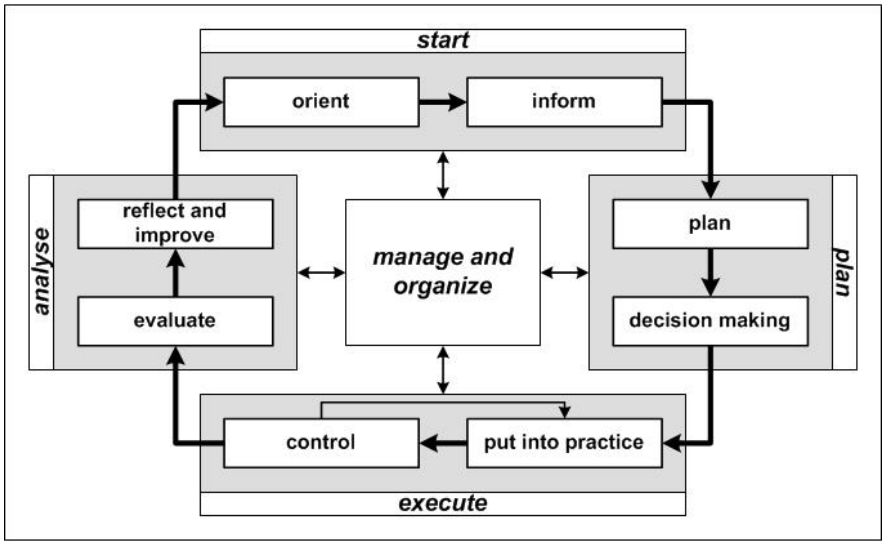
2 Basic Principles

Project management is a well-established and internationally approved way and habit of work within professional practice. It requires personal responsibility, reliability, team work, thinking ahead in causal relationships, and creativity in action. Learning project management is not possible without "learning by doing." To learn project management requires to plan and to execute projects within teams, to ensure the quality of the project results in unison, and to reflect on the learning and working process as a team. The skill to work in projects, to solve problems, and to ensure the quality of the project results (=project management) is a central and very important vocational competence. The work in projects can foster learning experiences, which are usually not given in regular classroom teaching, such as the experience of solving problems in a team. Through solving real-life projects in teams, project-teaching makes a great contribution in fostering higher-level study resp. working skills. To achieve these challenging goals, it is necessary that teachers work together intensively. This collaborative work has to be based on a school year-plan that incorporates regular exchanges about methods, techniques, topics, media, and evaluation criteria.

After working with the PM-methodology "Project Management: Setting the Standard in Schools", the students can draw on (a) basic experiences with specific contents of a particular vocational sector and get acquainted with their division into logical working steps; (b) they have been working in a team, and have learned to accompany working processes on an interpersonal level, along with analyzing and developing solutions; (c) lastly, students have learned concrete techniques that help structuring and planning complex work procedures.

2.1 Principle of Complete Action

The approach „Project Management: Setting the Standard in Schools" is based on the "central idea" of the complete action. What is basically meant here is that students and trainees plan, execute, finalize, and evaluate actions and decisions in operational (close) situations. Goal is that students become able to view a problem in its entirety and to evaluate and improve their own actions.



This project has been funded with support from the European Commission. This publication [communication] reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

Fig. 1: Principle of Complete Action

Two initial phases are in the focus of the present didactic conception (duration of 30 hours): (1) to start and (2) to plan a project. That means: The following statements refer especially to those two phases. To enable a complete action, it is necessary to afterwards (3) realize and (4) evaluate the project plan.

2.2 Principle of Didactical Reduction

The concept "Project Management: Setting the Standards in Schools" is based on a two-fold foundation: First, three fundamental didactic concepts (self-organized learning, co-operative learning and problem-based learning), and second, a two-phase schema (the principle of didactic reduction). This approach is graphically presented in the subsequent figure:

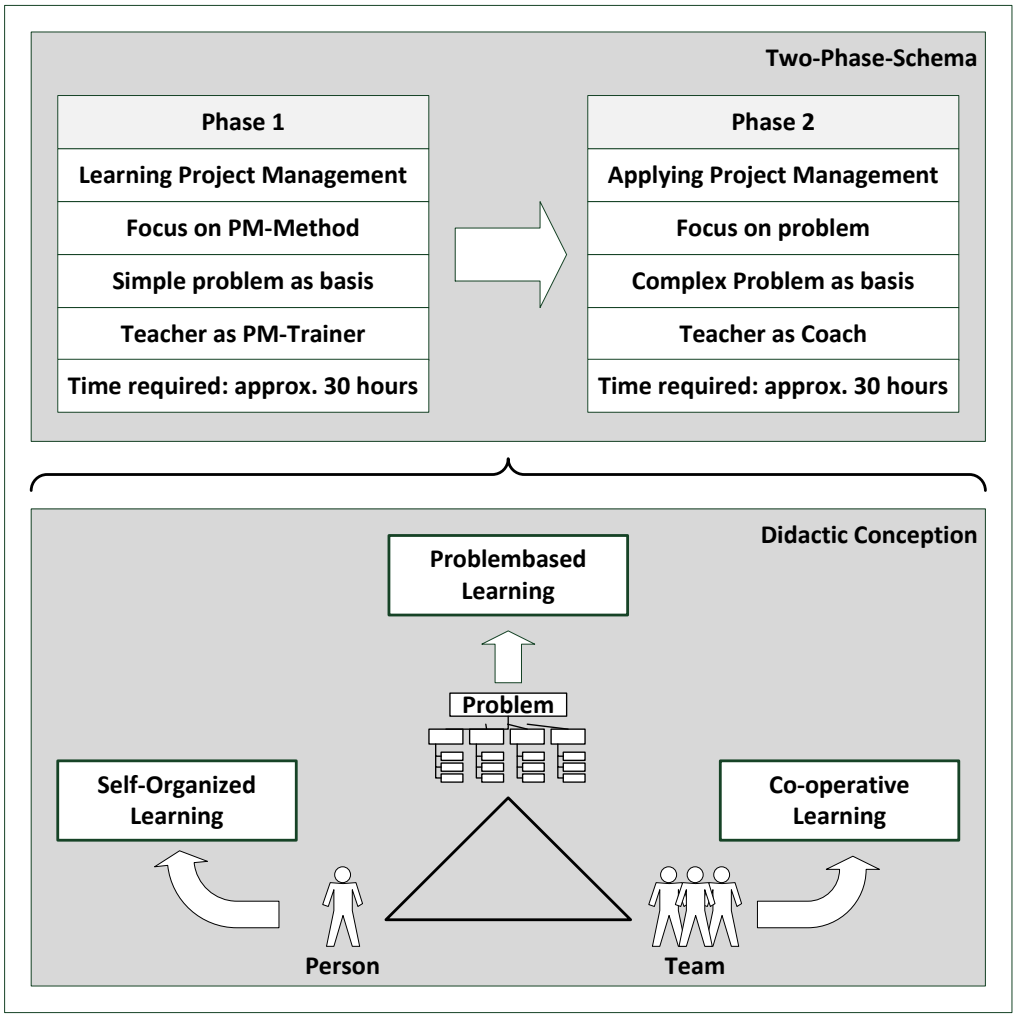


Fig. 2: The Concept "Project Management: Setting the Standards in Schools"

Project Management is a team-based method for problem-solving based on a combination of different problem-solving techniques in order to foster independent student work. These

This project has been funded with support from the European Commission. This publication [communication] reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

skills/competencies cannot be presupposed. Rather they must be acquired (accumulatively) starting from the first phase:

- Problem-based learning: How do I systematically solve a problem?
- Co-operative learning: How do I effectively/productively co-operate with others?
- Self-organized learning: How do I organize my work and learning?

In the first phase, the PM method will be learned by using the PM guideline for students and by applying a simple problem (i.e. organizing a school class trip). In the second phase, the content learned (the PM method) will be applied to a vocational issue/problem (mostly interdisciplinary and complex).

Regarding the PM-method, the second phase is a **repetition**: The PM-competence will be strengthened. Related to the vocational issue/problem, the second phase on the contrary is something new.

On the subject of the complete action model, the following project phases have to be gone through in a two-phase-schema:

- Starting and planning the project in a duration of 30 hours (a simple *training-project*: the focus is on learning the method)
- Starting and planning the project (a demanding *real project*: the focus is on the application of a complex vocational problem)
- Realizing and evaluating the *real project*

One-Phase-Schema as an Alternative: Within the didactic conception 30 hours are planned for the first phase of the two-phase-schema. Depending on (1) the level of difficulty of the problem and (2) the prior knowledge of the students, phase 2 may take up the same amount of time. Another alternative, that some schools prefer, is to solve already in phase 1 a more complex vocational problem. The students need, however, careful supervision by the teacher, because the students are being confronted with two problems at the same time: (1) Learning the method and (2) transferring the method to a complex problem.

Regarding the model of complete action, the students go through the following phases:

- Starting and planning the project within a duration of 30 hours (complex *real project*: learning and applying the method to a complex vocational problem at the same time)
- Realizing and evaluating the *real project*

2.3 Principle of Linkage of Didactic Conceptions

The three fundamental didactic concepts are the basis for both the first and the second phase. Next, the central principles of the three concepts will be explained through examples:

Problem-based learning: How do I systematically solve a problem?

This project has been funded with support from the European Commission. This publication [communication] reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

Principle	Technique	Objective	Page
Contextualisation	e.g. Stakeholder Analysis	Analyse the forces of the field	p. 24
Scope/Limit	e.g. Goal Matrix	Define objectives and non-objectives	p. 28
Splitting up	e.g. Phase Planning	Divide the project into phases	p. 31
Structure	e.g. Work Breakdown Structure	Structure the project into work packages	p. 36
Sequencing	e.g. Overall Project Schedule	Setting the order of the work packages	p. 42
…			

Hint: During the PM-training the techniques are the priority. The students should abstract the hidden principles from those techniques during their reflection. Afterwards, the students should "play" with those principles by transferring them to other problems. The inclusion of the principles helps to transfer the learned problem solution skills to other problems (far transfer of the learned).

Co-operative learning: How do I effectively/productively co-operate with others?

Principle	Technique	Objective	Page
Enable	e.g. DDTA Team Analysis	Identify strengths of team members	p. 13
Integrate	e.g. Team Roles	Clarify responsibilities	p. 17
Regulate	e.g. Team Rules	Agree upon the rules	p. 19
Reflect	e.g. Team Reflection	Strengthen self-control	p. 20
Document	e.g. Project Execution	Who does what, when…	p. 50
…			

Hint: During the PM-training, the students work in different teams, but work on the same tasks. The advantage of this approach is that students can compare their results. In this way they can additionally learn from each other. Another approach is that students split up one bigger exercise and work on the different parts in their teams. The **team building** can occur randomly or controlled by the teacher. A team should not be made up of more than 6 people. During the first learning and working phase (see guideline), the students have to discuss what different competences there are in their teams. Along with that, they also have to decide on team rules and team roles. Every team should have a moderator. Therefore, it is important that the rules for moderation are clear (e.g. staying neutral, control through questions, involving everyone, writing down questions/problem/results etc. immediately, so nothing gets lost). The role of the moderator can, but must not, rotate.

Self-organized learning: How do I organize my work and learning?

Principle	Technique	Objective	Page
Closing the shape	e.g. Complete Action	Enable experience	p. 8
Learning	e.g. Study Journal	Reflection of learning experience	p. 12
Participation	e.g. Work Packages	Take over responsibility	p. 40
Anticipation	e.g. Risk Analysis	Preventive action	p. 46
Presentation	e.g. Presentation of Results	Present results in front of others	p. 54
…			

This project has been funded with support from the European Commission. This publication [communication] reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

We can analytically distinguish between the three didactic concepts. Successful project work and successful project learning, however, require the interplay of the three components. Consequently, the Work Breakdown Structure (principle "structure" – problem-based learning) is a prerequisite for enabling individual responsibility (principle "participation" – self-organized learning).

Finally, it is the combination of the three components *problem-based learning, co-operative learning, and self-organized learning* which builds the system that embodies Project Management.

2.4 Principle of Role Variety in the Classroom

The approach of the guideline focusses on action-orientation in the classroom. It is therefore necessary that both teachers and students are ready for changes in their roles and to take on different roles as required in different situations:

Students take the initiative and work actively and often independently within the team. They work on a project order to solve a problem from a real or imaginary client. As contractors they come up with a solution and put it into action. During planning and organizing, they acquire knowledge, along with social and personal competences – especially the capabilities to act and to judge in complex situations. They reflect on their work and their learning process.

Teachers take on two central roles: On one hand they are being challenged in their role of the pedagogue/teacher, who has to create room for self-organized learning and to support the students to make use of it. For that role, we use the key term **coach**. On the other hand, teachers often have to take on the role of the **client**[1] in the context of project management. At what point they have to take on these different roles, decides the teacher according to the situation. Helpful, however, is to do the switch between the roles transparently and within a specific framework. This can be accomplished through specific (speaking) time slots that have been decided on in advance.

The pedagogue's/teacher's role is less the traditional **knowledge broker**, because the acquisition and application of knowledge is interwoven within the progression of the project (have a look at the commentary: Misunderstanding!). Learning takes place ideally in the process of solving the problem. Missing information should be researched and analyzed independently. If the learning environment is appropriately set up (books, magazines, internet, laboratory, workshop etc.) the students can acquire the knowledge themselves that is necessary to solve the problem. That is why the pedagogue/teacher can focus mostly on his/her role as the learning-companion and coach. It is on him/her to make sure that the requirements and the school-related framework is given during the whole duration of the project. As a coach the students are watched during their work within the project teams and selective assistance is given with contextual or methodological problems, without interfering too much. The pedagogue/teacher makes sure that the learning environment is pleasant

[1] The teachers should try to understand the point of view of the client, even though the real project-order comes from an external client. This "role play" helps to remove obscurities within class and helps to foster the students' orientation to the customer's needs.

This project has been funded with support from the European Commission. This publication [communication] reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

and offers only assistance if there are conflicts in teams. Moreover, the pedagogue /teacher has to make transparent the standards of performance evaluation regarding the expected results, and carries out the final assessment at the end.

One central **misunderstanding**, however, is that teachers are no longer allowed to teach contents directly. Of course, it is very **effective**, if students acquire information by themselves. This is, however, often not very **efficient** – that means: Students might need a long time before they master a specific topic. This time is missing later on when they have to do other tasks within the project work. That is why the teachers are always in the situation of estimating the situation: Does it make sense that the students acquire information by themselves, or is it better to systematically teach a specific topic? Here it is to establish a **balance** between the effectivity of learning (self-organized learning) and efficiency of learning (externally controlled teaching). To answer the question (When does it make sense to intervene as a teacher?) it helps to ask the question: Which learning experiences are made possible and are these experiences intended?

Another frequent **misunderstanding** is that teachers have to give control of the classroom to the students and that they only passively observe the students (the students are supposed to learn independently). The opposite is true however: Self-organized learning needs intensive **control over the context** by the teacher! The open time-slots are needed to do coaching-interviews with single team members or the teams, to give feedback, and to assess the progress and work of the students. If there are external clients, it is the teacher who functions as a bridge between the students and the client: The teachers help to prepare conversations with the clients (e.g. How do I act appropriately with the client?). Moreover, the teacher should talk with the clients beforehand (Are the problems appropriate for the targeted learning experiences?). Additionally, the conversations with the clients have to be evaluated afterwards.

Another role within this concept is the role of the **trainer**. The acquisition of the PM-methodology is supported *on one hand* by the PM-guideline, which explains the different steps in the process. There are two approaches possible: Teachers, who themselves feel a little insecure with the PM-methodology can use the guideline as a navigating vehicle that helps them to prepare classes. *On the other hand*, teachers who feel confident with the PM-methodology can demonstrate and actively present the different steps of the PM-process. They can use the guideline to evaluate the demonstrations with the help of the documented process steps. The advantage of this is that students experience a real example; it is, however, more demanding.

Consequently, teachers switch between the following roles in the classroom:

- Trainer of the PM-methodology
- Mediator of vocational and subject-specific information
- Coach and learning-companion
- Client

The roles pursue different intentions (e.g. coach versus client). That is why it is important that the students know what role the teacher takes on and acts on in a specific moment.

This project has been funded with support from the European Commission. This publication [communication] reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

2.5 Principle of Phase Orientation

The principle of the phase-orientation ties on directly to the principle of the complete action.

Clarification of Project Tasks – to start a project

Within the economical context, orders are given in the form of problems. These problems are then given to professional problem-solvers (here: students as contractors). Those analyze the problem and the context of the project within the first step. With targeted questions ambiguities may be removed. Afterwards, the contractor and the client specify the problem description and goal settings. It is important to plan enough time for this phase of problem-specification, because it does not only have a central relevance for the project management, but generally for the customer orientation of a company. An intensive and well-structured communication between contractor and client is the key for success. The formulation of the "right" question plays a central role here.

Even though the "clarification of the project tasks" is situated at the beginning of the rough planning and ends with a **Project Management File**, the project management file does not explain sufficiently what has to be done. To make the customer a profound offer, the students have to acquire additional information, that has to be structured and assessed (stakeholder analysis, goal matrix, and phase plan). These make up the base of the project charter. The whole rough planning basically serves the clarification of the order: The problem of the client is being observed from different perspectives and is being analyzed and specified with different tools until both parties (client and contractor) agree on the problem description.

Detailed Planning – to plan a project

Now, the detailed planning of the project begins. This phase has the aim to fix responsibilities, time sequences, and the quantification of resources. Only at the end of the phase, which finishes with a risk-analysis, it gets decided whether the project – as discussed in the planning – will be realized or not.

Project Execution – to realize a project

The execution or realization of a project is usually the goal of the project planning. This approach, however, usually serves to distinguish between profitable, barely realizable, and unprofitable projects within the economy. In that way, the project planning has its own value even without its realization.

In the classroom the prospect of project realization is always motivating students. The client (possibly the teacher) should, however, leave the possibility of realizing a project open, until the project planning has been finished. A risk-analysis could lead, even in schools, to the result that the project cannot be realized, or only through great means of effort.

If the teacher feels secure in the application of the method, the project planning which had been worked out during the PM-training (e.g. a school event) might afterwards be realized by the students. This should happen, however, only if also the students master the method, so that at the end, they can plan and document a domain-specific project by themselves.

This project has been funded with support from the European Commission. This publication [communication] reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

Project Close-Out

To finalize the project properly, it is important that the project closure has a functional and commercial focus: The students finish-up final works, do the account of charges of the project, and file the documents. In the pedagogical context, this phase serves two goals: (1) saving the learning experiences (e.g. by issuing project-reports and by preparing a presentation with the key moments of the project) and (2) evaluating the students' performance (e.g. by assessing the documentation and presentation, and by reflecting in an interview the project's process and project's results).

This project has been funded with support from the European Commission. This publication [communication] reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.