SOLOS

Solutions for Logistics Skills

Extend your profession.

The SOLOS model

Learning causes and learning guidance in the SOLOS model

Brochure 2

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Contents

A) Learning in the process of logistical work

1. Learning in the working process: What is it about?

"Learning in the working process has become a competitive advantage for enterprises. Processes of improvement and optimisation, quality assurance, generating knowledge and other contemporary management concepts and methods require learning processes which take place in the immediate working context. This form of learning is broadly considered more important than the still dominant form of courses and seminars in further training. The shift of terminology from qualification towards competence development emphasises this change of perspective in in-company education and training. It is not predominantly about analytically set qualifications which are than taught in seminars, it is about holistic competencies which are acquired in the worlds of work and life."

Peter Dehnbostel, *from Informelles Lernen: Arbeitserfahrungen und Kompetenzerwerb aus berufspädagogischer Sicht, p. 2*
http://www.swa-programm.de/tagungen/neukirchen/vortrag_dehnbostel.pdf

The SOLOS learning model Solution for Logistics Skills views itself as a specific contribution to learning in the process of logistical work. Of importance in this model is: learning takes place **within work for work**. It is apparent that a form of organisation appropriate to this kind of learning must be found and / or invented. The current learning culture is based largely on the separation of working and learning according to the notion: "First, one learns a thing, then it is applied at work". Such a procedure, however, is increasingly limited in today's knowledge-based economy because the requirements in a changing working world do not allow for the static understanding of the sequence of learning and working. Instead, it is of importance that employees and executives find a new pattern of organisation and determination for processes of qualification which occur within the running business.

The Berufsbildungsbericht 2002 (Vocational Education Report) of the German Federal Ministry of Education and Research notes with regard to learning in the working process:

"1. In enterprises there is an increasing expectation that workers themselves solve arising problems in the working process and contribute to continuous improvement processes. Associated problem-, situation- and potential-related learning takes place largely self-organised. According to experience, this ability is not normally acquired within training events. It rather poses a challenge to the learning, working and organisational culture in which room for development, decision-making and scope for action is allowed for. This requires conditions which enable competence development within the working process and an organisation that is open to the transfer of such competencies. This also necessitates a re-design of social relations within the enterprise.

2. The learning culture of a given enterprise – especially in sectors of the future – is a vital resource of strategical development and international competitiveness. Hence, sound business decisions and subsidies aim at unfolding such learning cultures that support creativity and innovation through learning in the working process."

Berufsbildungsbericht 2002, *Lernen für eine Gesellschaft und Arbeitswelt im Wandel, Chapter 5: Weiterbildung*
5.3.2 Lernen im Prozess der Arbeit
German Federal Ministry of Education and Research
http://www.bmbf.de/de/8725.php

Learning in the working process is thus no more an isolated issue of qualification and training experts and HR officers but it is in the process of becoming an established issue of strategical consideration – especially in the context of a globalized economy and demographic change. However, this form of learning cannot be left to itself, it must be pushed and promoted actively!

The promotion of learning in the working process requires a clear formulation of goals, defined areas of design and well thought out forms of organisation. It is the responsibility of management to ensure that the following depicted contents are considered in this context. This enables the necessary conditions for practical application of learning in the working process.

"Learning within qualifying working processes is a basic form of human learning. However, the not so effective, casual learning must be shaped in a way that makes it learning in the context of challenging tasks."

Felix Rauner, *Weiterbildung im Spannungsfeld technologischer und ökonomischer Innovationen, Kick-off meeting for the project "Weiterbildung im Prozess der Arbeit", Filderstadt 2004*

Learning in the working process

2. Learning groups in logistical work: Competence development and process optimisation work hand in hand

Knowledge of work processes is a key term for the inter relation between competence development and process optimisation. One possesses such knowledge based on subject-related qualifications and experience evolved from working activities. It relates to the entire working process, including other workplaces and tasks.

In the case of logistical work, this means: the worker in incoming goods of a logistical service provider is not only proficient in their immediate workplace but also knows what has to happen to the goods delivered beyond their workplace, i.e. on the way to storage and which preparatory steps they must take for this procedure. Their knowledge of working process also helps them estimate what they needs to do in order to ensure the necessary quality and safety in the handling of goods.

The competence development of the individual must always take place in the context of the workplace and system. Working in systems is characteristic for logistical work. A logistical system is not limited to one location in one place. Logistical service is an intra-, inter- and super-organisational system – in and between production sites, in trade and related transport, in hospitals, in waste disposal, etc. – it requires actors who understand this system. This is what we refer to when we speak of logistics systems competence:

- **1. Understanding logistics as a system**
- **2. Understanding logistics systems**
- **3. Acting competently within logistics systems**

(see SOLOS brochure 1 "The SOLOS model", p. 5)

This individual competence development takes place in the working process, thus an immediate effect on work and enterprise is tangible and desired. This is important in routine situations as much as in unexpected problem situations where competent and flexible reaction is needed.

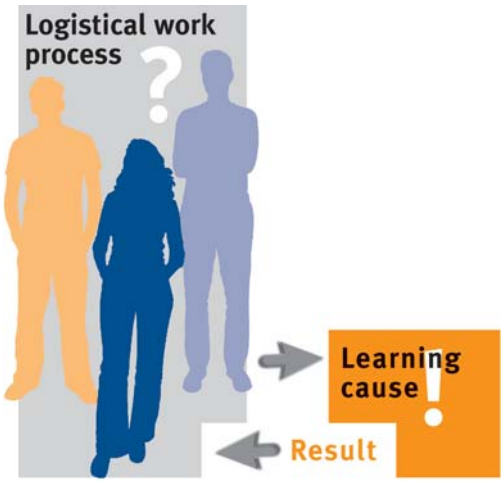
The CEO of a logistical service provider states in this context: : *"The worker has to be proficient in his work in the hub and he must understand how the hub works. The hub makes visible how the cooperation of different logistical service providers in a network works. The individual partners have to reflect upon and talk about the network – not only on the executive level but also on the operative level. All actors involved must understand that their very actions affect the joint product – the logistical service."*

"Problems arise when actors are afraid of making a decision."

In-company routines involve a number of challenges, particularly with regard to the so-called "If-then-situations": If a delivery for a customer has to be fitted in, if an unforeseen delay occurs, if the team has to take on another task... The list can be amended by anyone who works in such an area of responsibility within a company. The importance is that all actors can act appropriate to current situation and aim. Every individual within the process must know what is the right thing to do and how it is to be done.

Learning in the logistics sector is chiefly "learning in a group" when it is about the work process and logistics systems competence. Specific training areas obviously remain important, when it comes to teaching individual aspects of knowledge and skills such as obligatory hazardous goods seminars, handling of hard- and software, technical equipment etc.

Learning in the working process: Direct relationships between the working and learning process.



Learning takes place in the direct context of logistical work: the impetus for learning, the so-called learning causes, are obtained from the work process; the results of the learning process then feed back into the work process.

"As a dispatcher, one must possess distinctive logic, recognise interrelations before something happens, be able to assess situations as fast as lightning."

Summary: Learning in the process of logistical work

It is about utilising learning forms which take the actual situation within the enterprise as the starting point and aim of qualification.

Learning impetus = learning causes can be taken on in a targeted manner.

The company-internal situation is hereby perceived as both a field of action and a field of learning.

The group or team that works together along the logistical process chain also learns together with regard to the logistical process.

The group benefits from the development of the individual and each individual from the evolution of the group.

The joint learning situation is influenced upon by all actors, and each actor takes on responsibility with regard to the outcome.

B) Learning causes in logistical work

1. Learning causes are not invented, they are found

Learning impetus and learning causes are incidents and structures in in-company procedures that give cause to learning experiences. Learning causes can arise for a number of reasons which we have used as a basis for a simple categorisation. Within the SOLOS model, we distinguish between situational and planned learning causes.

2. Categories of learning causes

Situational learning causes arise from immediate working contexts in the enterprise. Commonly, they are characterised by certain constellations within the process, the time schedule, and the cooperation of people. They are not necessarily present at all times but recurring and lead to certain consequences which again lead to errors, a lack of quality and often to open or latent conflicts and a loss of trust within the enterprise as well as in external relations. This list emphasises how important it is that managers have the necessary sensitivity and overview to recognise the causes of such situations (i.e. learning causes).

Examples of such situations highlight that they occur more often than not in all-day working contexts. Shaping learning causes from these contexts can be especially effective when actors have become used to the fact that "things are as they are". Potential for change initially seems widely buried.

The categorisation of examples of "situational learning causes" was done by company-internal participants of a SOLOS qualification and hence mirrors the practical, in-company perception of problems and solutions.

Situational learning causes

Triggers	Target formulation for each learning cause
Hazardous goods accidents	Professional handling of accidents (This is about the overall situation surrounding a hazardous goods accident, not the immediate accident)
Problems in daily routines and procedures	More efficient and effective routines
Telephone conduct	Competent on the phone
Cargo securing	Better safe than sorry
All-day interpersonal problems	United we stand...
Customer problems	Stay calm

Planned learning causes arise from foreseeable changes. The learning cause can be worked on in advance in order to avoid problems before they arise.

The following examples highlight how the overall planning and preparing process and learning within the working process can be integrated. It is about finding ways of involving actors in the learning group and their experience in processes of change.

customer relations. Interface problems appear difficult to grasp with regard to the actual cause. It is often about structural contexts but there are also solutions to such problems.

Planned learning causes

Triggers	Target formulation for each learning cause
New customer	Integration into operative business
Re-structuring within a division	New procedures – new tasks
Integration of new co-workers	Welcome!
Re-structuring of Rangierdienst	More efficient and effective routines

The following list of examples for situational as well as planned learning causes emphasises how it is mostly not the exceptionally or rarely arising problem but about the recurring, all-day problem. Working on a learning cause – this is the core thought of the SOLOS model – should not and cannot be an isolated event, as such, the effect would not be sustainable or even counter-productive. Learning causes that are found in day-to-day business should be worked on with a certain though not compulsory regularity. It can prove to be useful that learning groups vary in their members. As such, they can benefit from the experience of other individuals or teams.

The essential reason for situational as well as planned learning causes is often found in interface problems. Such interfaces influence upon the process in various forms. They are considered particularly crucial because they can disturb planned procedures. This can occur within but also in between divisions but typically also between one enterprise and its suppliers and also applies to

3. Different learning causes – differentiated ways of working on them

The SOLOS model offers a variety of methods of working on learning causes within a learning group. The learning guide supervises, knows and understands the possibilities offered by those methods. As such, they are a key figure within the SOLOS model, their role and responsibilities are described in detail in chapter C. The methods including relevant materials are described in chapter D.

But firstly we wish to take a closer look at the meaning of the application of different methods.

All methods require the learning team to be willing to work on a learning cause in a structured manner. A precondition for this is sound motivation communication already exists within the group or that there is a good chance of developing it within the learning process.

The methods are mostly self-explanatory as they are based on visualisation. The participants can immediately see the results of their work and can relate to it in the next steps.

At the end of each learning session the results are visible and available to all participants.

This form of visualisation can also be used to make the results visible to other actors within the enterprise if it becomes necessary to involve them.

The form of the learning cause and the respective methods are experienced as one by all members of the learning group which mainly means that the work is based on fixed rules and forms of visualisation that the participants are familiar with. No extra efforts have to be undertaken to introduce the group to a method. The members of the learning group gain a certain sovereignty in dealing with the methods which can relieve the learning guide.

The methods can be combined so they can all be applied in more comprehensive working processes of a learning group in order to work on different steps. The learning guide is hence able to support his learning group effectively through necessary visualisation in all learning phases.

Summary: Learning causes in logistical work

Learning causes are "found" immediately within company-internal tasks and contexts.

Learning causes form the contextual guidelines of the work of learning guides and learning groups.

The results are shaped in a way that allows for immediate implementation in the enterprise.

The methods of the SOLOS model enable the involved learning guides and learning groups to link working and learning in the organisation.

Methods and task setting decisively support the competence development aimed at.

C) What does learning guidance refer to?

1. Learning guidance as a company-internal task

The ideal learning guides work in middle management positions; they are typically actors who pass on experience and know how to pass on results “to the top” as well as being able to help implementing solutions “at the bottom”.

Actors involved in the piloting of the SOLOS model have summarised expectations of learning guides as follows:

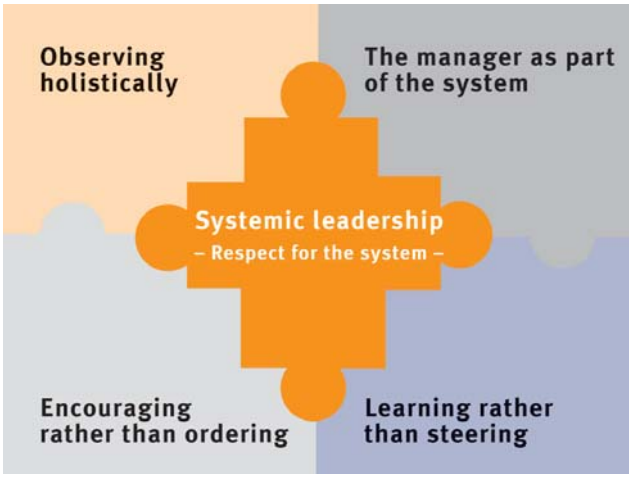
Personality
The learning guide
- ⇢ works in a target-oriented manner
- ⇢ inspires trust and can in turn trust his workers
- ⇢ is open towards his workers
- ⇢ can listen and is open towards constructive criticism
- ⇢ ask the workers and admit their own ignorance

Subject-oriented competence
The learning guide
- ⇢ knows interrelationships
- ⇢ combines subject and management knowledge
- ⇢ implements customer requirements in a subject-oriented manner
- ⇢ can work on problems, also in a detailed manner

Management style
The learning guide
- ⇢ promotes self-initiative
- ⇢ is responsive to workers and seeks dialogue
- ⇢ has moderation experience
- ⇢ regards themselves as a coach
- ⇢ regards themselves as primus inter pares and has a cooperative working style

Expectations of the learning guide of their learning group
- ⇢ It is important that the learning guide has and articulates clear expectations of their learning group so that they get an overview of their working field and system
- ⇢ To develop self-initiative and think on their feet
- ⇢ To develop and implement results jointly

The message of these lists is apparent: whoever aims at being a competent and well-accepted learning guide must exhibit a modern management style, e.g. by embracing the following characteristics.



*Example for the approach of systemic leadership, see **Daniel F. Pinnow,** Führen – worauf es wirklich ankommt, Wiesbaden 2005*

It is important for the concept of learning guidance that specific tasks can be integrated into management behaviour and style that is desired and practiced within the organisation. This forms the necessary foundation of an appropriate learning culture.

This is the crucial challenge to enterprises that wish to work with the SOLOS model. Learning guides and their work cannot be regarded as the proverbial “lick of paint” that covers over problems rather than solving them.

A decision for work process-oriented learning and the application of learning guides as is implied in the SOLOS model is a strategical decision that necessitates change. It must be incorporated and accompanied by company management.

2. The role of learning guides

Learning guides are initially observer, scout is an appropriate term. They are familiar with company-internal contexts and targets, they know the problematic interfaces in and between divisions and the resulting learning causes.

They listen when executives and workers identify weaknesses and validate in how far these can be utilised as learning causes. They are builders who assemble working and learning through the use of learning causes.

Their work can be summarised as follows:

- They recognise and name acute learning requirements.
- They choose learning causes and prepare their application in terms of content and organisation.
- They accompany and supervise the learning group in their work.
- They ensure that learning results can be utilised for the good of the enterprise.
- They disseminate the results within the enterprise, especially to the management level.
- They assess if there are individual learning requirements.
- They share the responsibility for the learning process with their learning group.
- They achieve acceptance of the learning group through their attitudes and actions.

A central part of the role of the learning guide is the actual work with their learning group. The methods that were devised for this work are described in detail in an isolated chapter. The following aims at introducing organisational design and scheduling of the work with the learning group. Stringent guidelines on how the learning guide should work with his learning group are neither necessary nor productive.

It is, however, recommended that the learning guide and his group agree on rules regarding the location, appropriate times of preparation and duration of meetings, documentation and dissemination of results as well as the communication style. This should not follow general rules but can and must be decided upon within the parameters of the individual organisation. A conducive working atmosphere is the prerequisite for success.

Part of this atmosphere is that all actors involved are on par with each other. The workers in the learning group are the actors who have experience and knowledge and can contribute through pragmatic approaches to solutions and whose competence development can be promoted through their role as equal partners in the learning group.

The learning guide is well-equipped for their responsibilities if they has gained experience in moderation (training and practice) and thus is capable of achieving good internal communication through the application of the methods provided. Experiences with the SOLOS model have shown that it is useful if the learning guide is not their "own boss", i.e. is not the direct superior of the division in which is learning group is situated. If this is not the case, it can become difficult to hold back own opinions. "Flooding" the learning group with ideas of the learning guide would be counter-productive as this limits the motivation of the group members to offer opinions openly and with commitment To sum up: The learning guide should be the corkscrew rather than the cork in the "bottle of ideas."

3. Preparation for the role of learning guide

It is ideal to let future learning guides participate in a training workshop. In the first phase, logistics systems competence and the related competence learning should be addressed. This can represent an "umbrella" for the following phases. The logistics system of the own enterprise should be drafted by the participants. This forms a good basis for developing a view for the identification of learning causes within one's own environment. The categorisation of company-internal learning causes forms the basis for the introduction of methods, first practical application of methods and the related practice and assessment phases.

After approximately for weeks, the future learning guides meet in a second workshop. Here, initial experiences will be evaluated and the question of which learning causes are to be utilised will be discussed. The group works on the methods, learning guides can test the methods using real learning causes from their enterprises, also in order to stimulate ideas for possible procedures of learning sessions.

Summary: What does learning guidance refer to?

Learning guides are the fulcrum of work process-oriented learning in the SOLOS model.

Learning guides should come from the middle management level but should not be direct superiors of the members of the learning group.

In order to fulfil their responsibilities successfully, working guides need framework conditions that are supported by the company's management. This particularly applies to the management and learning culture within the enterprise but also to opportunities to implement the results from learning sessions.

Learning guides need acceptance of the learning group with which they work, management and learning culture plays a crucial role in this.

In order to be successful, learning guides need appropriate preparation for their job in which they can familiarise themselves with methods and reflect upon their role.

D) Methods suitable to the work of learning guide and learning group

1. Selection and application of methods

The following criteria should be met by the methods applied:

- They should be easily usable for work with learning groups.
- They should effectively support group communication without restricting its contents.
- They should facilitate achieving results in short spaces of time allocated for the learning sessions.
- They should be effective at visualising the learning process and results.
- The results should be visualised in a way that is comprehendible to the participants.

Why different methods? We apply different methods for situational and planned learning causes. The fish bone diagram, for instance, is suitable for situational learning causes. Planned learning causes can be worked on well with the help of pictographs with which the current and target situation can be depicted well. A visual comparison of current and target state can be achieved through this. A third method is especially useful for working on typical logistical interfaces.

Each of the three methods uses a characteristic form of visualisation: The joint work of learning group and learning guide leads to the development of a concrete "image". Such visualisations can also be used as a basis for debating rather difficult issues, conflicts can be discussed in a more direct manner. If people "don't beat around the bush" whilst at the same time concentrating on the concrete learning cause, the work of learning guide and learning group can retain the necessary pragmatism. This way, the results that are achieved by the learning group have a higher chance of successful implementation in the process of logistical work.

2. The fish bone diagram

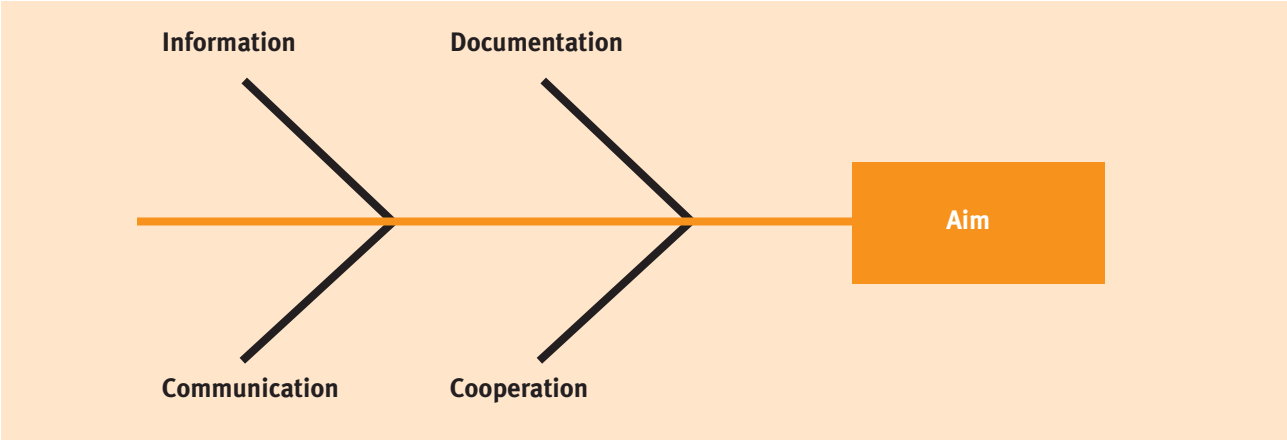
This method – invented some fifty years ago in Japan by Kaoru Ishikawa and hence often referred to as Ishikawa diagram – has been successfully used in various adaptations in enterprises for a number of decades. Among others it is being used in the balance scorecard method, also referred to as the four M method as the individual ends of the fish bones are titled man, machine, material and method. The four-bone version can also be extended to six bones in order to work on additional foci.

Logistics systems competence manifests itself in four fields of action, these are information, documentation, communication and cooperation. These fields of action can momentarily become fields of learning during the learning process (see Brochure 1, The SOLOS model, p. 7). In accordance with this, the ends of the fish bones in the SOLOS model are titled information, documentation, communication and cooperation.

The fish bone diagram is used in situational learning causes (increase in errors, problems in existing processes, etc.) as it enables the learning group to advance swiftly from the immediate trigger to the actual reasons for and causes of the unsatisfactory situation.

Fish bone diagram | pictographs | tree jigsaw

The fish bone diagram, here aiming at the extension of logistics systems competence



In the course of the dialogue with logistics enterprises, a question catalogue relating to the individual fields of action (see appendix) was developed which can be used as an orientation framework by the learning guide/group. The included questions can help uncovering problems in the sub-processes of what actors do and how they do it. The responses are taken down on the fish bone diagram (pin board, etc.), visible to all participants. In the next step, the learning group establishes a ranking of the responses given.

For example: In the field of information the group can be asked how and by whom an actor is being informed, how they then processes the information and in what form the result is being documented and/or passed on. This is a form of process analysis in a sub-area or a detailed examination of the workflow in this area. It is not, however, about describing how things should be but how things are actually done in the framework of given circumstances. The concrete work in and with enterprises highlights weaknesses relatively quickly, however, they should not be re-covered through finger-pointing immediately, the responses should simply be taken down and recorded for further work steps.

The detailed sequence of steps for working with the fish bone diagram:

The learning guide chooses a learning cause and prepares a limited selection of questions (either taken from the question catalogue or formulated by themselves). They also formulate the aim of the learning session. Here, it is important not to use negative formulations, e.g. in the case of cargo securing not that in the future no insufficient cargo securing should happen anymore, but the positive formulation: “Better safe than sorry”.

In the first step of the learning session, the group answers the selected questions, the responses given are recorded visible to all participants.

All group members then choose the most important responses according to their opinion and hereby establish a ranking. The result should be approximately three to four responses that are worked on in the next step.

In the next learning session, group members are asked to make suggestions with regard to the chosen issues. If it appears useful and necessary, the learning guide can also make suggestions that are then discussed by the group.

In the next phase, a to-do-list is developed from the suggestions made. The implementation of the to-do-list will later be commenced by the learning guide – supported and supervised by the involved executives. The members of the learning group are actively involved in this process as far as it takes place in their immediate working environment.

The learning guide also organises the dissemination of the results of the learning session. They also record the working process towards the results achieved so that they can use it in future learning sessions with the same or other groups.

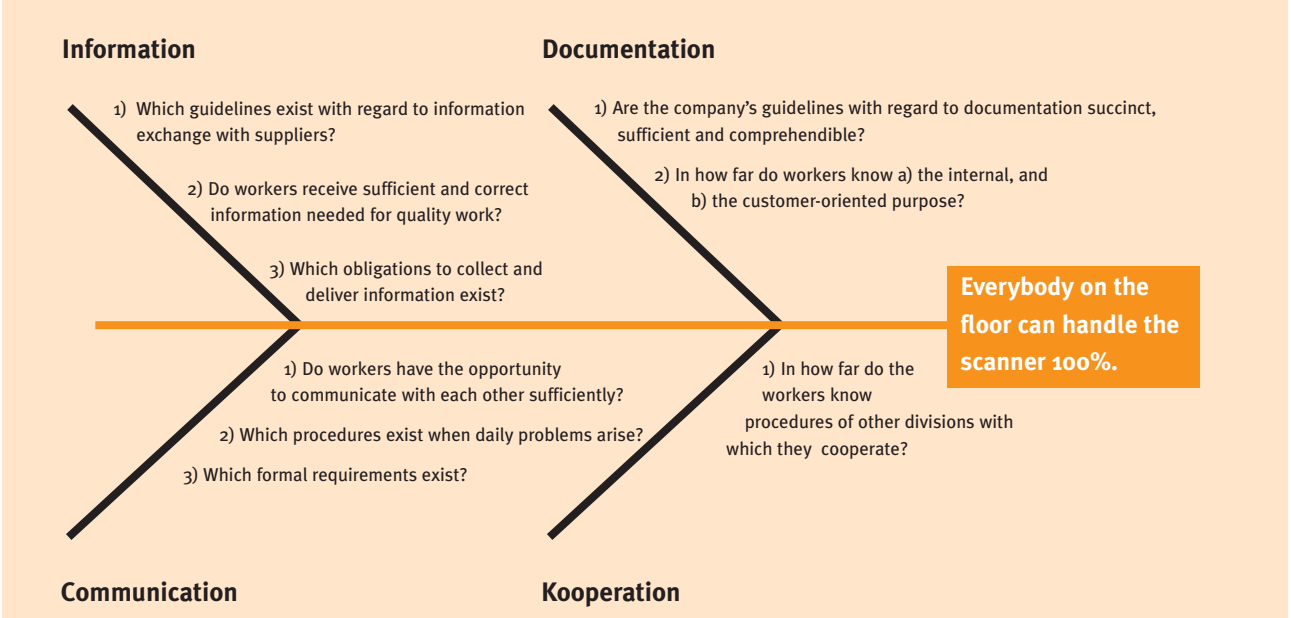
Practical examples for the work with the fish bone diagram

The use of scanners was identified as a learning cause in an enterprise. The trigger was recurring insufficient use of scanners although the usual instructions did take place.

The learning guide has selected relevant questions from the catalogue and identified the aim of the session, using a positive formulation: **Everybody on the floor can handle the scanner 100%.**

The following depiction shows the initial situation as prepared by the learning guide.

Practical application of the fish bone diagram



The following list shows which results were found in the learning session. The points behind the answers mirror the result of the ranking. It becomes apparent that the main cause for the problem was found in the insufficient instruction of workers. (Info 2 b / 8 points). The explanation for this is that there is a high degree of fluctuation in this division and not all workers speak German sufficiently in order to fully understand the contents of the instruction.

The importance of documentation in this context is not fully grasped, as is shown by the high number of points under the first documentation question (Documentation 1) in the list below. A further indicator in this context is the assessment in the field of cooperation (Cooperation 1 – 5 points).

Responses to the questions regarding the scanner problem

Information 1
Which guidelines exist with regard to information exchange with suppliers?
⇢ Drivers queue in unloading zone and are unloaded there.

Information 2
Do workers receive sufficient and correct information needed for quality work?
⇢ No, because
a) instructions cannot keep up with the high degree of fluctuation, and
b) the instruction of workers is insufficient.
8 Points

Information 3
Which obligations to collect and deliver information exist?
Obligation to deliver 1: executive informs worker sufficiently.

Obligation to deliver 2: worker immediately notifies shift leader of deviations.

Obligation to collect worker: worker is obliged to collect missing or misunderstood information from the shift leader.
3 Points

Documentation 1
Are the company's guidelines with regard to documentation succinct, sufficient and comprehendible?
⇢ For the sender, the answer is yes, for the recipient – due to his language abilities – it is not entirely comprehendible.
5 Points

Documentation 2
In how far do workers know
a) the internal, and
b) the customer-oriented purpose?
⇢ in both cases: no!
2 Points

Communication 1
Do workers have the opportunity to communicate with each other sufficiently?
⇢ Yes, but not everybody feels comfortable doing so.
2 Points

Communication 2
Which procedures exist when daily problems arise?
⇢ Information to shift leader, verbally.

Communication 3
Which formal requirements exist?
⇢ Shift leader has to fill in form with his own formulation for points.

Cooperation 1
In how far do the workers know procedures of other divisions with which they cooperate?
⇢ They do not know it because the description of other divisions is too complex.
5 Points

The learning group has decided, following their own prioritisation of issues that the targeted instruction of workers should be put on the to-do-list (Information 2 / 8 points). As a first point on this list, it was noted that a simple measure should improve the status quo. In the second place, the to-do-list included the strengthening of workers' understanding of processes and procedures in der Halle (Documentation 1/ Cooperation 1).

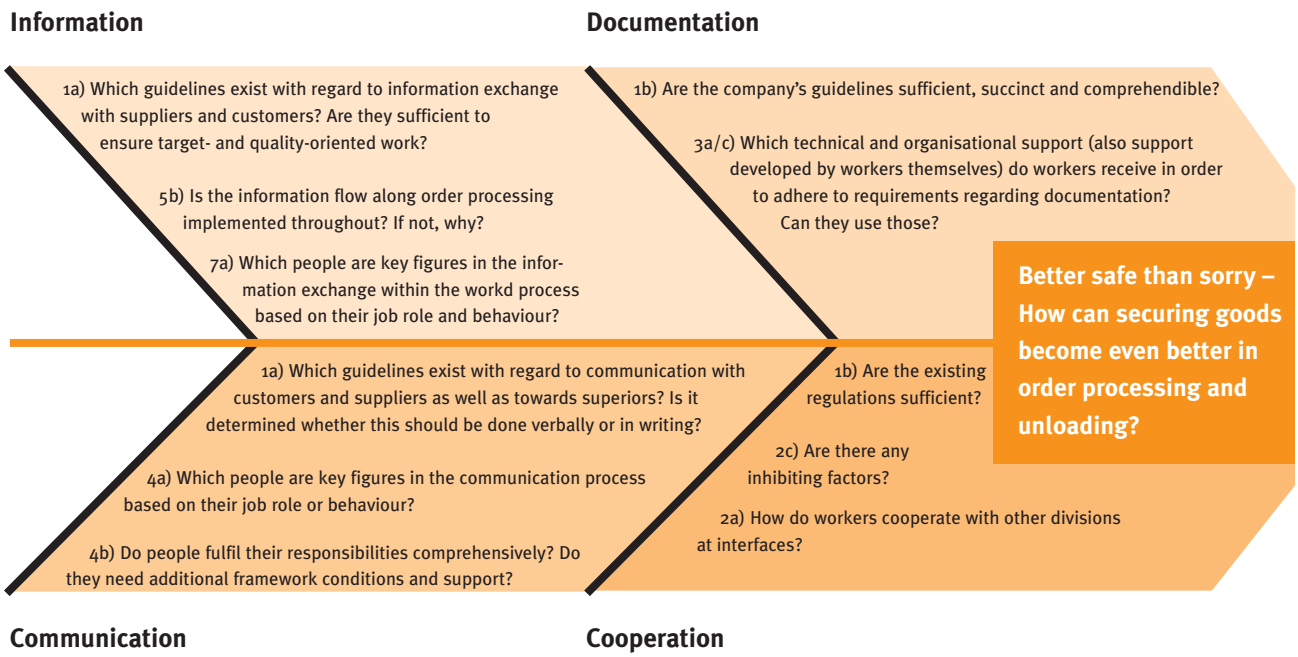
This measure was implemented as follows: In addition to the usual instruction, simple cards were developed which summarised the most important information regarding the handling of scanners and particularly the technicalities of scanning. These should offer increased security as to how to go about the scanning process. The general idea: Each worker can carry the respective card in the pocket of his work gear and look up information whenever needed.

With regard to the second issue: A so-called "buddy model" for new employees was suggested at the co-worker level.
Further, foremen/women and warehouse supervision will include information regarding the overall process in their regular meetings more often.

The other responses with the relating points remain in the learning guide's documentation and can be activated at a later stage if necessary. The issue of "scanning" does not have to be re-visited over and over again but existing working results can be referred to where necessary.

Another example shows how the learning guide has prepared the learning session with another group through the selection of relevant questions from the question catalogue.

Preparatory work of the learning guide



If one compares both examples, it becomes apparent that the question structure in terms of content and the amount of questions are approximately the same. The major differences only arise in the process of formulating an aim and further through the answers and the ranking.

It is effective, if the number of questions is limited, and the structure becomes familiar through repetition. The confidence with methods that can develop within a learning group contributes to the relief of the learning guide. He does not have to introduce the method again and again but can build upon his group's growing experience regarding the procedures of learning sessions.

3. Pictographs

Just as with the first method, the central characteristic of this method is the visualisation, however, in this case in a different context. **The fish bone diagram predominantly visualises interrelations between the four fields of action of logistical work. The pictograph method aims at visualising processes and sub-processes.**

This happens with the aid of cards which depict actions in form of pictographs, i.e. in simplified image language. A picture of a telephone represents calling, a circle of people represents team meetings, a fork lift truck represents all forms of transport processes within an enterprise and so on.
Experience shows that the work with pictographs is particularly effective in the use in planned learning causes. Especially where an existing process is to be changed or adapted, be it through new forms of technology or other internal or external requirements, the visualisation of both the old and the new process next to each other can help the learning group. If the new process has already been established elsewhere, pictographs can facilitate the understanding and implementation of content and aim of the changes. If the new process remains to be designed in detail, the learning group can undertake this in a structured manner with the aid of the pictographs. It is that all participants can "keep up" with the visualisation.

There are pictographs for typical tasks and responsibilities in the four fields of action of logistics – informing, documenting, communicating and cooperating – and also those that refer to the more technical and organisational aspects of logistical work. Such pictographs can be designed quickly and easily, for example by using Clipart.

Examples for pictographs that relate to the four fields of action of logistical work

Validating written information and documentation

Carrying out entries into forms, etc.

Recording and archiving information

Telephoning

Working on something in a group

Discussing something

Examples for typical tasks in operative logistics

Unloading

Loading

Commissioning

Scanning

With the help of such picture cards, a given procedure, e.g. a logistical sub-process can be depicted, i.e. visualised, by the members of a learning group. This is especially effective when something in this procedure is to be changed. Hence, this method is best used for planned learning causes.

The procedure of the method goes as follows:

The learning guide chooses the learning cause and formulates the aim. The criteria for the formulation are the same as described previously, so formulating an aim positively again is helpful.

The learning group initially depicts the existing procedure or sub-process using the pictographs provided. This means that a sub-process is visualised, the extent of which is determined by the learning guide and learning group. The pictographs are used for the visualisation in order to depict the most important work steps in the order in which they occur.

In the next step, the future (i.e. changed) sub-process is depicted, again using pictographs and notes where needed. For example, the difference between current and future state can be the use of different technical equipment (see image above, pictograph series “scanning”, where the use of scanners is introduced to a division).

The following phase involves working on the question what has to be organised differently in the future and which workers will be facing new tasks and responsibilities. This step can also lead to the group devising an alternative to the future process, e.g. including changes in details of the procedure. The involved workers can contribute through their experiences with the status quo, can make suggestions for the new procedure and hereby gain their own understanding of the changes and their effect.

If the future procedure has been depicted as an image in the form of pictographs and notes, a to-do-list can be compiled. This will mainly involve innovations that come along with the changes of the sub-process. Experience shows that it is mostly about the details of such innovations. In order to ensure that all actors involved have appropriate and well-coordinated opportunity for the preparation of changes, the learning guide will coordinate the implementation of the to-do-list with the affected superiors as well as the operative level.

The to-do-list ist geared to the question **what has to be changed where** and how and in what order these changes should be implemented in terms of personnel and time schedule.

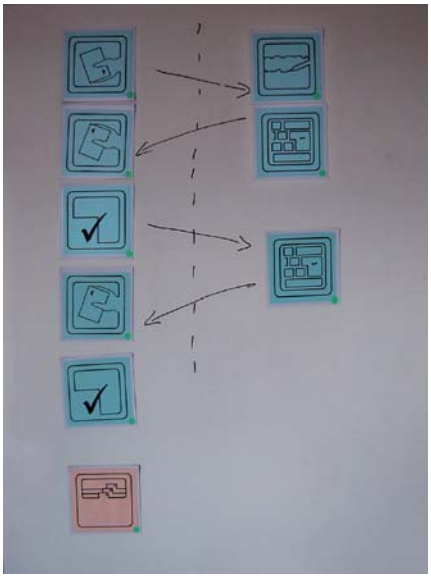
Using this method, **it is important that the depiction of current and desired state in form of pictographs and comments are well-documented, if possible using** photos. This way, the results of the learning session can be used by other involved parties, e.g. management. The documentation in form of images also aids the implementation. The last step involved the documentation of the entire learning session and its results by the learning guide.

Practical example for working with the pictographs

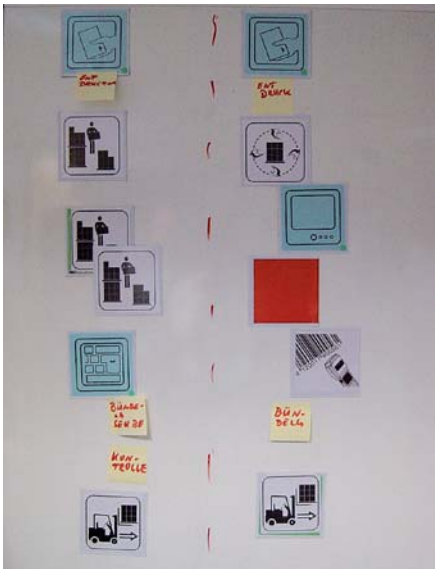
The following depictions are an example of how to work with pictographs. Example 1 shows that the learning group has amended the current situation (on the left) by adding a task in between receiving information and passing on information. In future, the receiving of information shall be recorded in writing, then saved and sent to the recipient either via e-mail or the intranet. In the next step – verification of documents – again, the data is saved and passed on accordingly. The learning group has acknowledged that the passing on of information in verbal or written form can become difficult if other requirements in terms of security and verifiability of information transfer and processing exist in the future. If one proceeds as described above and shown in the pictograph series of the desired state, according to the learning group, the current documentation at the end of the subprocess (which was originally perceived as insufficient) becomes obsolete which is visualised through the red card with the filing box pictograph. The to-do-list includes a description of the new procedure and a list of necessary technical requirements.

The following image shows clear changes in the desired state on the right compared to the current state on the left. This also includes the application of different technical equipment, e.g. working with a scanner. The processes can be visualised in sections, hence very detailed; this enables the learning group to see procedures and changes clearly and also to contribute own experiences and ideas into the process of change. This has proven to be very effective because the “language of the pictographs” and the direct communication relating to the “image” complement each other. If necessary, additional text cards can be integrated into the pictograph series as shown in the image below.

Pictograph session 1



Pictograph session 2



4. The tree jigsaw

This method is certainly the most unusual of the three methods used in the SOLOS model, however, it is a very effective way of highlighting and working on problems of interfaces. In this context, it should be borne in mind that logistical work is characterised by three paradigms: “Understanding logistics as a system / Understanding logistics systems / acting competently within logistics systems.” It is especially these paradigms that can be visualised and implemented within the company with the help of the tree jigsaw.

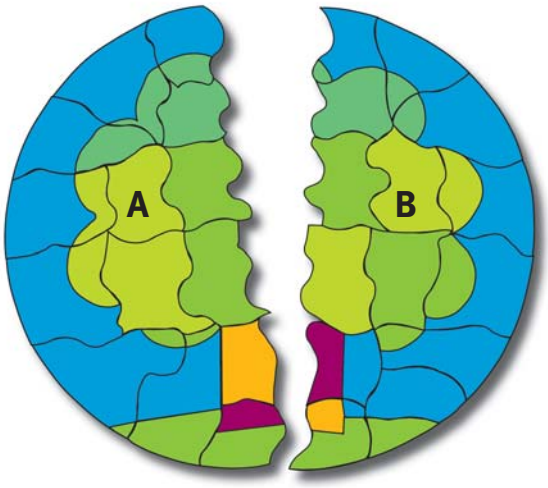
In its original round form, the jigsaw represents a functioning system in which all parts fit together and make a joint whole. If all parts are aligned in the right way, i.e. if everything is aligned correctly within the system, the tree is clearly visible. As such, it represents a “whole image”.

The learning group works with a jigsaw puzzle consisting of 28 magnetic pieces which enables the use on a white board or a similar appropriate place. The jigsaw can be divided into a number of fractions or sub-areas.

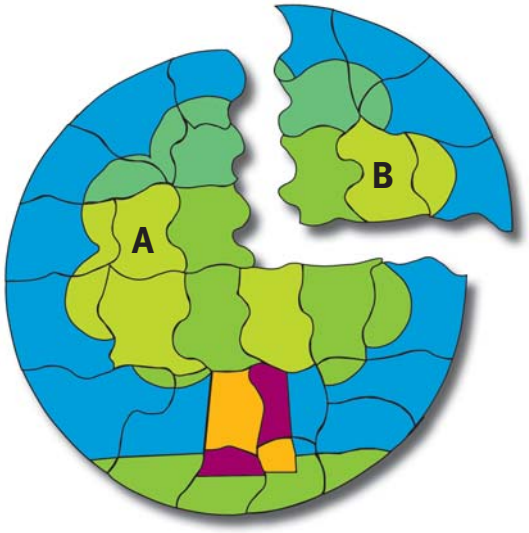
If this is done, the round form of the jigsaw as well as its image of the tree are not clearly visible anymore. The visual signal highlights: “Things don’t run smoothly anymore”. The gaps between the sub-areas are too large which means: The interfaces between individual divisions in the company and / or between the company and its partners are real trenches which make cooperation very difficult.

This state is depicted in an exemplary and graphic form in the following section.

Tree jigsaw



The system is divided in two halves A and B which are separated by a large interface.



The major part of the system is well coordinated (A), an important part (B) is seperated by a distinctive interface.

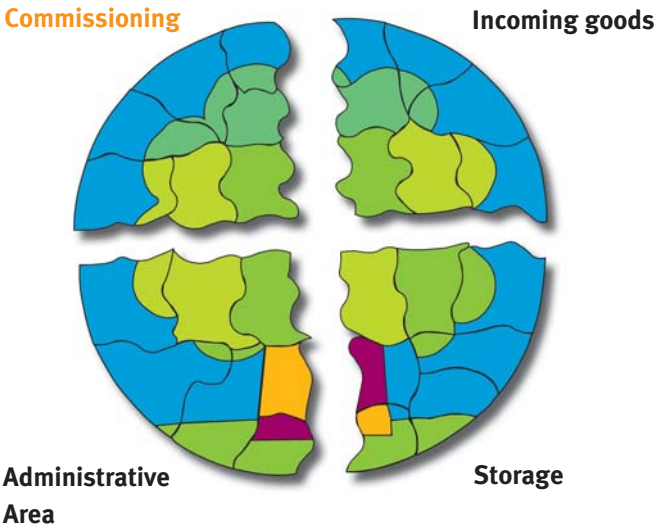
The learning guide can organise a sequence of steps in this process. Like before, they first choose a learning cause, in this case the learning cause is derived of the fact that the system is not running smoothly. They then choose the area within the system in which interface problems have arisen and invite a learning group from this area, e.g. incoming goods or shipment or a group of dispatchers who steer a logistical division. The larger the enterprise, the more important it is to choose the right sub-division as this is necessary in order to keep a sufficient overview and degree of detail in the learning group.

In the initial stage of the learning session, the whole jigsaw is visible to the group. Part of the jigsaw (approximately a quarter) represents the division of the learning group itself – in this case commissioning. The other parts of the jigsaw – again approximate quarters – represent other areas of the system with which the learning group cooperates. This could be incoming goods, e.g. the entrance area to enterprise premises with the according verification and notice, storage or cargo handling area and the administrative area.

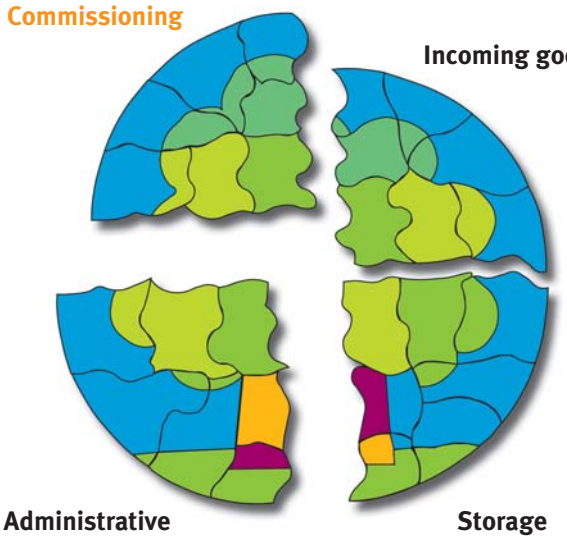
1. Quarter: Commissioning
2. Quarter: Incoming goods
3. Quarter: Storage
4. Quarter: Administrative area

In a concrete example, such a grouping varies from company to company and from process to process. It can be useful to integrate representatives from suppliers or delivery transport partners into the learning group. The choice is made by the learning guide and learning group according to each working cause.

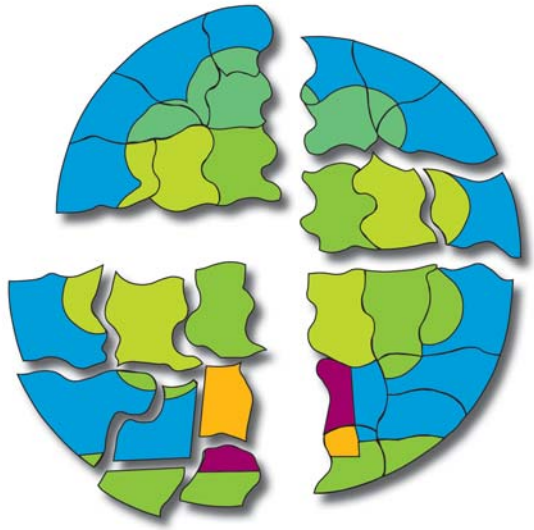
The next step is to position selected divisions / areas in relation to the division of the learning group – again in accordance with the individual learning cause, here: “The system is not running smoothly”. The jigsaw is divided more or less fragmented fashion. The learning group contributes its views of the distance to the individual divisions to the image. Hereby, the actual breadth of each interface is being visualised; the trenches become apparent.



In our example, it could be that incoming goods regards itself as one team with storage so that the respective quarters of the jigsaw are relatively close to one another. This highlights that the cooperation with storage is viewed as good. The learning group continues with the other involved divisions accordingly. There might, for instance, exist a much broader interface between incoming goods and administration.



The learning group can thus draw a realistic image of the current state of the system from its own perspective. In the next work step, this image will become clearer as the learning group amends it with notes (e.g. post-its) about the actual causes of problems in (sub-)systems. These notes can either be stuck right onto the jigsaw image or attached next to it. Causes could be problems such as incomplete or delayed information, technical problems in the information chain, or recurring errors in processes that cause problems in incoming goods. The learning guide can again resort to a ranking in order to differentiate between the importance of the issues raised.



In the next step, a to-do-list is compiled with the aim of making interfaces as narrow as possible so that the overall system is in sync again. The to-do-list can be compiled by the learning group itself or be suggested by the learning guide in parts or completely. Either way, the learning group works on the to-do-list in order to integrate it and articulate their own expectations of other involved actors. In the to-do-list, the learning group also highlights which possibilities for improvement it sees.

The implementation of such a to-do-list can offer a large number of possibilities. This ranges from simple technical and organisational changes to complex expectations regarding the dealing of groups among each other and reciprocal respect for each other's work. This places extra responsibilities upon the learning guide to arrange the implementation of the to-do-list in a way that involves all concerned parties.

The jigsaw helps to visualise complex interrelations. It is appropriate for the visualisation of positions and actions of actors in concrete cases / procedures. The aim – as usual – is to create changes that help make the system "whole" again. Disturbances that have been made visible ought to be removed. As logisticians say: interfaces must be transformed into seams. This can happen on the personal level, e.g. if actors had previously not been willing to cooperate sufficiently. Problems can also be down to interrelations within processes that, when changed, can lead to

a solution. Working with the jigsaw puzzle can help to decide which interface to work on and how to do so.

The learning guide records the work of the learning group – if possible by taking photographs – and the following steps of the implementation. Thus, they always preserve which issues have already been dealt with and what remained open for later stages.

Summary:
Methods suitable to the work of the learning guide and learning groups

The joint characteristic of all three methods: They offer possibilities of visualisation, hereby supporting the learning group through creating an "image". The aim of this is to make interrelations, procedures and positions usable as fields of work process-integrated learning processes.

The fish bone diagram helps to visualise interrelations between the fields of action of logistical work.

A series of pictographs can depict sequences in sub-processes enabling the comparison of current and desired state. The degree of detail can be adapted by participants where necessary.

The jigsaw puzzle can visualise positions of actors / groups as well as structures within a process with the aim of overcoming interfaces.

This form of learning can give impetus for change that can be substantiated by the group in form of a to-do-list.

The interrelation between learning cause, learning process and result will be visible to the learning group.

The learning group is immediately involved in the implementation of results and directly perceives changes and success.

The PROLOG project – SOLOS experiences

"European Training Profiles in Logistics – PROLOG" was a project supported by the Leonardo da Vinci programme of the European Commission.

The results of the PROLOG project want contribute to the professionalisation of logistical work. The learning model **SOLOS – So**lutions for **Lo**gistics **S**kills – was developed and tested within the project. Exemplary competence requirements for three prototypical logistical job profiles were described according to the EQF: foreman, warehouse supervisor and dispatcher. The SOLOS model enables workers in those occupations (but also other workers in the sector) to further develop their logistics systems competence. The learning process takes place in real working contexts. In this process, learning guidance is viewed as part of the management culture.

The PROLOG project with its Solutions for Logistics Skills also makes a contribution to the European skills initiative. A European dialogue offers a forum for exchange of experiences and results from other logistics projects in order to develop a European qualification standard for logistics.

The products

Brochure 1: **„So**lutions for **Lo**gistics **S**kills –
Extend your profession. The SOLOS learning model
Language: DE/EN/PL/CZ

What is logistics systems competence and how can it be achieved? This is what the first brochure about the SOLOS learning model addresses. The process of competence development in the framework of logistical work is explained.

Brochure 2: **„So**lutions for **Lo**gistics **S**kills –
Extend your profession. Learning causes and learning guidance
Language: DE/EN/PL/CZ

This brochure highlights how and by the means of which causes learning in the context of logistical work takes place. Exemplary learning causes are presented. The role of learning guidance and methods for the creation of learning processes are explained.

Brochure 3: **„So**lutions for **Lo**gistics **S**kills –
Extend your profession. Competence profiles and competence requirements in logistics
Language: DE/EN/PL/CZ

The competence requirements for the three competence profiles are described: foreman, warehouse supervisor and dispatcher. They serve as prototypes that can be applied to other job profiles.

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PROLOG

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Solutions for Logistics Skills
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Appendix: Catalogue of standardised questions pertaining to the four fields of action in logistical work

Note: The catalogue of standardised questions below represents an adaptation of a previous catalogue developed in the project Strengthening logistics through in-company competence development (Stärkung der Logistik durch innerbetriebliche Kompetenzentwicklung). This project was managed by the Bildungswerk der Thüringischen Wirtschaft e. V. and supported by the German Federal Land of Thüringen and EU funds (project duration 2006-2008). Dr. Karin Bockelmann has contributed to the results of the project PROLOG as an expert parallel to this project. The pictographs were also developed in this project, the pictographs relating to operative logistics were developed in the PROLOG project.

Information

Aims, use and organisation of information – standard questions

1. Determination of standardised design of information flows	1a) Which guidelines exist for information exchange with customers, suppliers and forwarders? Are these guidelines sufficient for ensuring targeted and quality-oriented order processing? 1b) Which guidelines applying to everybody exist for the work process-related information exchange between colleagues, divisions and shifts? Are these known and adhered to by all? Are they sufficient for ensuring targeted and quality-oriented order processing?
2. Guidelines for written and verbal exchange of information	2a) Are there any guidelines pertaining to how written and verbal information exchange should be conducted? Are these known and adhered to by all? 2b) Are procedures of written and verbal information exchange effective and do they ensure targeted and quality-oriented order processing?
3. Selection and dissemination of information	3a) Which guidelines exist for the selection and dissemination of verbal information? 3b) According to what criteria is information selected and disseminated? 3c) Which obligations to collect and deliver information exist? Are these recognised and implemented by all? 3d) How effective are structures of information selection and dissemination?
4. Use of technical and technological equipment and other tools	4a) Which technical support is necessary in order to ensure standard information exchanges (e.g. telephone, e-mails, fax, internet)? How effectively are they being used?

	4b) How is information for targeted and quality-oriented order processing supported (e.g. through inventory control systems, customer and supplier administration programmes, systems of storage administration)? Are IT hard- and software sufficient and usable?
	4c) Are there any other support tools, e.g. shift log books, documentation of orders, that help visualise information processes? How effectively are they being used?
5. Expectations regarding quality of information flows	5a) Do workers receive sufficient and correct information in order to carry out quality-oriented work?
	5b) Is the information flow adhered to throughout order processing?
	5c) How effective is the design of information flows?
6. "Information fulcra" for matching of information status of involved actors	6a) Which fixed times exist for meetings, 5-minute-talks, etc. and what other possibilities for information exist in the division in order to keep workers up-to-date?
	6b) How effective are those measures (dissemination structures, times, issues)?
	6c) Do all workers receive the right information at the right time?
7. "Key figures" in the information flow	7a) Which persons are key figures of information exchange in the work process based on their job profile or behaviour?
	7b) How comprehensive do these persons fulfil their responsibilities? Do the necessary framework conditions exist for them? What kind of support do they require?
	7c) Which information is needed from other divisions?
8. "Information interfaces" to other divisions and information offerings regarding work and business process in the own logistical (sub-) system	8a) Which information is to be passed on to what other persons in other divisions?
	8b) How do these information exchanges work?
	8c) How can workers inform themselves about their tasks?

Documentation
Aims, use and organisation of documentation work – standard questions

1. Determination of documentation	1a) In which form are workers required to record their work in writing? 1b) Are company-internal guidelines for documentation sufficient, succinct and comprehendible? 1c) Who is responsible for what documentation?
2. Aims of documentation	2a) In how far do workers know a) company-internal, and b) costumer-oriented purpose of documentation? 2b) In what manner is documentation for management work (e.g. shift and holiday planning, rewards, sanctions)? 2c) In how far can documentation be used as a basis for analysis and improvement of logistical processes?
3. Instruments for the support of documentation processes	3a) Which technical and organisational support (e.g. documentation guidelines, forms, software, databases, entry masks) are at the workers' disposal in order to adhere to documentation requirements? 3b) What effect do support tools have on the time effort? Are there more effective ways? If yes, what are they? 3c) Are there any "documentation aids" in the division that have been developed by workers themselves that could also be used by workers in their environment?

Communication
Aims, use and organisation of communication processes – standard questions

1. Regulations for in-company communication and communication with customers and suppliers	1a) Which regular accompanying communication is necessary among workers, between workers and executives (e.g. team meetings, 5-minute-talks)? Are there any guidelines for those? Are those known to all? Where are they documented (e.g. workplace descriptions)? 1b) Do workers have sufficient opportunity to communicate about work? 1c) In what rotation does regular communication take place? Are the space of time and interval sufficient? 1d) Which procedures exist for communicating acute problems in the division? Are they known to all? How effective are they? 1e) Which regulations exist for the communication with customers, suppliers (communication procedures, obligations of proof, communication partners)?
2. Regulations for verbal and written communication	2a) Are there any regulations about which communication processes should be verbal and which recorded? Are these known and adhered to by all? 2b) Which formal requirements exist for written communication? How much time is required for written communication? Are the existing requirements and the time frame appropriate? 2c) Are procedures of written and verbal communication perceived as effective and useful by all actors and do they aid quality-oriented order processing?
3. Support of communication processes	3a) Which measures ensure that workers can communicate about work (e.g. team meetings, exchange of experience)? Are the opportunities provided sufficient? Do workers see need for change? If yes, what kind of change? 3b) Which needs exist for individual communication beyond official measures in order to support team spirit and motivation? Are freedoms offered by the company for this sufficient?

	3c) Which individual communication processes have developed that help ensuring the quality of work? 3d) Which forms of communication for exchanging information are preferred by workers? Are these in keeping with guidelines and regulations?
4. "Key figures" of in-company communication processes	4a) Which persons are key figures of communication processes based on their job profile or their personal behaviour? 4b) Do these people fulfil their role holistically? Are the necessary framework conditions in place? Which support do they require?
5. "Communication interfaces" in the own and other division	5a) Are the communication structures (who is supposed to communicate with whom?) and interfaces comprehendible for all workers? Are there any mailing list or organisation charts that clarify this? 5b) Which work-related communication with neighbouring divisions is necessary for fulfilling the tasks? How is this being implemented? Are the existing conditions sufficient? 5c) What need for communication with other divisions exists beyond this?

Cooperation
Aims, use and organisation of cooperation processes – standard questions

1. Regulations for cooperation within the division	1a)	Which regulations exist for cooperation among workers within the division and withother divisions? Do all workers know the existing regulations for cooperation and are they accepted by everyone?
	1b)	Are existing regulations sufficient or should further agreements be made for in-company cooperation?
2. Regulations for cooperation with other divisions	2a)	How do workers cooperate along interfaces with other divisions so that a high level of quality of work can be ensured?
	2b)	In how far do workers know procedures of other divisions with which they (are meant to) cooperate?
	2c)	Are there any inhibiting factors that make good cooperation with neighbouring divisions difficult?
	2d)	Are procedures and workplaces designed in a way that allows for cooperation of workers?
	2e)	Do workers know the tasks and procedures of their colleagues and is it possible to swap workplaces from time to time?
	2f)	What support on behalf of management is possible / necessary for improving cooperation?

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