

# The activity stream: applying social media concepts in PLM

Reiner Schlenker<sup>1</sup>, Patrick Müller<sup>2</sup>

Usability Consultant and Partner of CONTACT Software<sup>1</sup>  
Product Management and Consulting, CONTACT Software<sup>2</sup>

## Abstract

With the success of social media PLM vendors started to explore the possibilities of this new form of networking and communication capabilities. After a first hype it seems that the topic has been ranked down in the priority list of the vendors or has even a negative connotation. Despite that certain existing pain points of PLM systems can be solved efficiently with social media concepts. This article analyses the value of social media components in a PLM context. It illustrates a smart application of selected social media principles in CONTACT's *CIM Database PLM*. The article provides insight into the concept validation and software engineering process of the new component called *Activities* which is currently being tested in the field. General experiences and findings will be discussed.

## 1 Introduction

Usability has become an important demand for business software like *PLM (Product Lifecycle Management)* or *ERP (Enterprise Resource Planning)* in the last years. User acceptance and business capability depend increasingly on ease of use, information transparency, functional availability (i.e. robust operation) and many more challenging requirements. Nevertheless this kind of software is still designed to support highly complex industrial processes, especially in engineering design and production. These IT systems are comparably complex to what end users experience in pure standard software (e.g. office software) and social web-applications. A direct transfer of social media components to PLM is conflicting with fundamental PLM principles (e.g. careful access rights control or reliability of information). At this point it becomes interesting to investigate, which principles and features from social media may add value particularly to PLM and how this can be achieved effectively. This question will be addressed in detail in this article from an engineering and IT perspective. Basics of PLM/PDM and social media are considered given as a prerequisite for readers of this paper. The concepts are well established and described in various publications or practical solutions.

One major target of PLM is to enable internal and external collaboration among engineers and their organizations. Collaboration – from a PLM perspective – has four significant dimensions (Müller et al. 2013), which briefly can be framed as follows:

1. *Communication*: Information exchange between partners to reach their aims.
2. *Coordination*: Management of project teams, aims, work tasks, etc.
3. *Knowledge integration*: Domain knowledge integration, modeling etc.
4. *Information logistics*: IT-supported information management

## 2 State of the art

### 2.1 Social media and PLM – observations

The interest in social media as element of PLM has been slowing down in the PLM community quite soon after the first hype occurred some years ago. Even before applications could prove remarkable benefits at the customer side it seems that the topic has a lower priority in the meantime for the software vendors. Or, with a more drastic statement: Social PLM 1.0 has failed (Shilovitsky 2013b). The following empirical findings and experiences suggest that it probably has never been in that state:

- Although it is changing, many managers are still skeptical about the actual benefit. Some managers consider social media as productivity killers (Skeels & Grudin 2009; Archambault & Grudin 2012).
- According to empirical findings after (Müller et al. 2013), social media lack significant value to many PLM end users. In contrast to other management-oriented studies the participants – engineers and engineering managers – did not consider social media as a future innovation or a problem solver. Nevertheless they demanded solutions that inform them about the various aspects of their daily PLM work (e.g. immediate information about project status changes or new engineering change requests). This triggers questions and assumptions: One assumption is that the boundary conditions of first approaches to integrate social media to PLM were not appropriate to add value to the engineers needs. The need for information is often context specific and not simply covered by a possibility to communicate to anyone in a network.
- In the PLM field new technologies and concepts need a significant longer amount of time to be established and widely accepted than e.g. in the highly dynamical social media field. (The reasons are manifold and are not discussed in this paper.)

To establish social media concepts in PLM systems we need to analyze the reasons mentioned above and develop solutions that have a practical impact at the customer side. Simply copying features from *Facebook* as “I like your CAD design” is probably rather counter-productive. The approach is to understand the current pain points in a PLM environment and think about possible solutions in the social media field that would turn these pain points into ease and happy cases. Social media as one piece of a PLM ecosystem

still has to prove practicability in the daily use. The following paragraphs describe one possibility to implement social media features in the PLM system.

## 2.2 Practical pain points

The current PLM functionality covers mainly the topics information retrieval, document- and lifecycle-management. Depending on their focus they include many specialized features like CAD integration, item/BOM management and interfaces to ERP and CRM software. Moreover there are some basic usability issues depicted in the next paragraphs.

### 2.2.1 Poor communication capabilities

Most of the PLM related communication takes place outside the PLM systems and this is one of the main pain points for PLM users. For example, besides their actual design work CAD engineers spend a significant amount of their time communicating with various stakeholders and the exchange of data with other teams and systems (Müller et al. 2013). Thus CAD documents are often exported and transferred via e-mail or ordinary network file storages. There they get beyond control of the PLM system and the information objects and master data get easily out of sync. Additionally the PLM-related communication is not transparent for everybody – e.g. when stakeholders are forgotten in e-mail or phone conversations, if they join the project in a later phase, or when extensive discussions end in severe e-mail flooding. Another main flaw is that the communication is not linked to the PLM object (e.g. in terms of the project, task context or product context).

### 2.2.2 Missing transparency

PLM users, especially engineers, often miss features for a better project transparency. The users want to be informed about the current (workflow) state of their projects, documents, items, etc. (Wendenburg 2013). This offers several opportunities for a social media adoption within the PDM system since the information is often already there but is not presented to the user in an appropriate way. For instance information about state transitions of PLM objects can trigger follow-up activities of users. An item state change may automatically trigger a chat record for a reviewer to request the approval of the related CAD document and may automatically post information to the project team if project milestones are affected or overdue. Another scenario is when the deadline of a task is approaching and the task owner and project manager are informed. There are many other possible scenarios and currently the PLM systems have workarounds like triggering e-mail notifications to relevant stakeholders. But again, the communication takes place outside the PLM system.

### 2.2.3 Timeline based activities

Many PLM activities happen along a timeline. Some needs are satisfied with features as Gantt-charts to visualize project plans. Anyhow, there are other activities that are not represented in that way, for example the timeline of the project communication or special activities like reviewing and releasing documents.

## 3 Smart integration of social media and PLM

### 3.1 Requirements

The pain points mentioned above bear a considerable potential for adopting certain social media concepts to improve the PLM-related communication. Independent of the possible solution we can formulate the following needs of PLM users:

- Enable easy to use communication capabilities in the PLM system.
- Attach discussions to PLM objects (which is also closer to the human way of communication: communication is around topics).
- Make the whole communication accessible for all current and future stakeholders.
- Create system generated messages that show up automatically in the user's work context.
- Smooth integration in daily work tasks (few clicks, tagging, directly context driven)

### 3.2 Solution concept and implementation of the *activity stream*

The following concept and solution is based on CONTACT's CIM Database PLM. The social media component was integrated directly into the PDM system, i.e. PLM concept. The following sections provide insight into the concept, its origination and final software implementation. The explanations focus on aspects of software usability in general and on PLM usability in particular. Proven design methods of software engineering have been applied.

#### 3.2.1 Adapting and transforming the activity stream paradigm

To meet the given requirements the idea was to expand the PLM system with communication features and to develop a solution that adopts the activity stream paradigm of social media applications (Anon 2014). Although there were no urgent customer demands at that time, CONTACT software decided to begin with the realization of a pilot application in 2012. It was embedded in a larger GUI project for their PLM system *CIM Database*. At that time such an application was not known to us, but other vendors as SAP were working on similar solutions and presented them e.g. at the World Usability Day in Bremen in 2012. The basic concept of the activity stream particularly within PLM has later been described by (Shilovitsky 2013a).

The pilot application had basically two main application scenarios. Firstly, enable users to discuss topics related either to certain subjects or directly linked with PLM objects like documents, items/parts, work tasks, projects, etc. Secondly, provide users with relevant information about their work context in the PLM system, for example discussion threads related to PLM objects (newly assigned tasks, status change of PLM objects, project activities, system generated messages etc.) or certain PLM/enterprise wide discussion threads for all users.

### 3.2.2 Activities – a CIM Database PLM component

The project was one of the first that followed a new agile development process based on Open UP (Anon n.d.). One part of the new process was the shift from system- to usage-centered development. Therefore the development team started with GUI concepts at the very beginning of the project applying rapid prototyping methods and creating lots of mockups (see Figure 1). Working with mockups had several advantages. The designers were able to rapidly design GUI designs and discuss ideas and concepts not needing specialized development resources. The mockups looked abstract (knowingly immature) and the team was able to focus on the actual concept. The stakeholders felt invited to bring in their thoughts. There were no time consuming discussions about the visual aesthetics like color, fonts, etc. in this early stage.

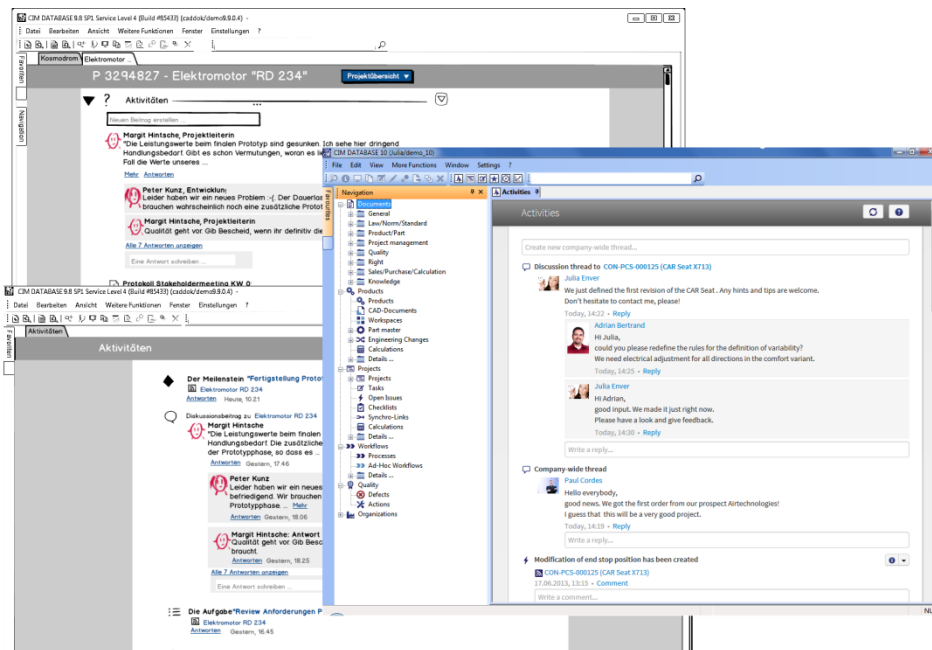


Figure 1: Mockups of the activity stream and the implemented solution

As soon as the mockups were in a mature stadium and the technical foundations were ready the development team started to implement a prototype that was internally reviewed by various stakeholders. The prototype was improved in several iterations and finally a pilot was realized and presented at a customer event. The general feedback was positive and CONTACT decided to integrate the *Activities* into the standard software offerings and also into the own corporate application of *CIM Database*. The current main features of the *Activities* (see Figure 1) are:

- Discussion threads that are linked to the actual PLM object, for example a project, an item or a document.
- System generated activities like the creation or status changes of associated PLM objects. The triggers can be customized to particular customer needs.
- A “global” activity stream that shows the latest information related to the user’s work context, like discussions in their projects, document reviews, released items or company announcements.
- A “local” activity stream that can be accessed for each PLM object; it shows the complete activity history for that object.
- Channels that can be defined depending on the customer’s needs for example special interest groups, departments, general discussion topics, etc.
- Subscription capabilities for fields of special interest (similar to RSS feeds).

## 4 Findings

The in-house installation in real corporate processes served as a first field test. Reactions and feedback from there are currently being collected and evaluated for the next version of the *Activities*. Generally the acceptance and usage is good and subsequently rising. Still, the in-house test uncovered further requirements for instance to enhance the representation of the channels in the global activity stream or to add specialized functions that probably will improve the effectiveness of the application. In order to meet additional needs, a next version of the *Activities* application is currently planned with several improvements that result mainly from the feedback of our internal users. The feedback is currently transformed into requirements and possible features that need to be prioritized. One important improvement will be a better representation of channels and subscribed PLM objects in the global activity stream. The intention is to evaluate the next version with an extended audience and conduct formalized usability tests with selected customers that are interested in the adoption of such concepts in their PLM or even corporate environment. There are indications that a critical mass of users, a certain degree of engineering competence, and distributed working users are three main conditions that may drive social media components in PLM, if these are smartly integrated into the engineering context (i.e. attached to PLM information objects).

Besides textual communication, visual representation of design content is becoming more and more natural. 3D visualization is natural for designer crating geometry for products. Anyhow, more PDM/PLM users have access to 3D representations of products and product components directly in the PDM/PLM system. CONTACT prepared a 3D visualization strategy that will support communication among engineers and engineering managers in a natural way. Content from the *Activities* and the embedded 3D visualization component will complement each other. Current development results will be reported in 2015.

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