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## Support Services: Persuading Employees and Customers to Do What Is in the Community's Best Interest

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# Support Services: Persuading Employees and Customers to do what is in the Community's Best Interest

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**Abstract.** Persuading workers to share knowledge in situations where “knowledge” is the primary asset making them valuable is a pressing problem in many organizations – leading to what we call “the knowledge worker’s prisoner’s dilemma.” An interesting variant of this dilemma arise in the contexts of technical customer support. We present a successful example of a cooperative resolution to the dilemma, the Open Source initiative, and articulate a thesis regarding the electronic support ecosystem. We then describe a multi-pronged approach for facilitating knowledge capture and sharing in the context of a support service industry, facilitating a “win-win” collaborative solution to the knowledge worker’s prisoner’s dilemma.

**Keywords:** knowledge sharing, prisoner’s dilemma, collaboration, customer support, system administration

## 1 Introduction: The Knowledge Worker’s Prisoner’s Dilemma

Asking workers to share their knowledge in situations where “knowledge” is the primary asset that makes them valuable is like asking taxpayers to spend their dollars to voluntarily contribute towards clean air. Everyone will benefit by contributing, but the person who will benefit the most is the one who does not make a contribution but benefits from the clean air others have paid for. Assuming that we all are rational human beings, it is not hard to see why no one would contribute to clean air and instead live in a polluted environment. Similarly, the worker who is able to zealously guard his or her knowledge but benefit from all the information contributed by workers to a centralized knowledge base has little incentive to contribute. Not only does he save the time and effort spent in sharing his knowledge but also preserves for himself the slice of knowledge that makes him highly valued and irreplaceable. In a competitive environment where workers value their time and jobs, it is again not hard to understand why a centralized knowledge base would lack viability despite the fact that if the collective knowledge and experiences of all the knowledge workers were pooled centrally and made accessible to all the players, everyone would benefit from the improved efficiency. This apparent paradox – where rationally behaving workers

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choose the sub-optimal path of non-cooperation is captured by the “Prisoners dilemma<sup>2</sup>”.

Contact center agents multitask - they speak and/or ‘chat’ (text IM) with the customer in need of support while searching for a solution to the problem. The main objective is to resolve the problem while minimizing the call time. Call time includes time spent on the call, time the customer spends on hold and time the agent spends documenting the call after it has ended. Importantly, agents are not rewarded for effectively documenting the problem resolution so there is little incentive for doing so. Moreover, current tools for contact centers fall far short of providing appropriate mechanisms for capturing and maintaining detailed descriptions of technical problems, solutions, and the processes by which these solutions are located and applied.

## 2 Successful Practices

One of the successful practices we can examine in an effort to escape the dilemma is open source software development. Open source has a simple philosophy that “when programmers can read, redistribute, and modify the source code for a piece of software, the software evolves. People improve it, people adapt it, people fix bugs ... at a speed that if one is used to the slow pace of conventional software development, seems astonishing [1]”. Knowledge development shares common goals with software development such as the desire to create high quality content, a need for early error/defect identification and fixes, and timely incorporation of new knowledge/features with up-to-date revisions. As such, knowledge development with broad participation from domain expert communities and the user communities can benefit from the open source philosophy and principles. User communities in open knowledge development play a more active and important role than in software development since users are the most likely ones to identify errors or shortcomings in existing knowledge documents and seek corrections, and/or identify the need for newly documented knowledge.

Amazon Books and e-Bay are two prominent e-Commerce retailers that have succeeded in creating self-supporting e-Commerce infrastructures. These companies rely a great deal on user created content and are trusted reference sites when buying books or making auction purchases. Users create product reviews, vendor reviews, reviews of the reviews, and ratings of vendors and reviewers. In many respects it is the high level of end-user participation on these sites that lends them credibility. It is important to examine the incentive structure used on sites like Amazon and eBay to understand how they have managed to escape the knowledge workers’ prisoner’s dilemma. Our thesis is that the same can be done for electronic support in the sense that the most knowledgeable people about a company’s products are not the manufacturers of the products, or the employees of the company, but rather the customers and users of the products. Thus an optimal support ecosystem is one where

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<sup>2</sup> The original conception of the “Prisoner’s Dilemma” is credited to Merrill Flood and Melvin Dresher of RAND and its formalization is credited to the mathematician Albert Tucker. See [2] for details.

the company simply facilitates customers helping other customers, thereby eliminating the need to amass expensive product expertise for support.

### 3 Solution for Knowledge Acquisition and Management

Our approach for facilitating knowledge capture and sharing in the context of IBM's service industry is multi-pronged. Firstly, our approach is based on "wiki-fying" knowledge resources, which enables maintaining up-to-date information at a minimal cost. Contrary to conventional knowledge management (KM) systems, which depend on knowledge producers to update and correct deficiencies in documents, our approach allows users (i.e. help-desk customers) to submit comments that become instantly visible to other users of the knowledge base. This objective can be accomplished through a wiki mechanism. This approach is most effective when there is no legacy knowledge base, or it is possible to replace a legacy knowledge base with a wiki-enabled data base containing wiki-enabled knowledge documents. In the case of an operational KM system, it may be impossible to replace it with a wiki-compatible database. Our system ensures that user comments only affect the presentation of the document, while the legacy document is not altered.

In parallel, our solution employs a *question-and-answer KM system*. In a conventional KM system, all "knowledge" is contained in knowledge documents, while queries are ephemeral and mapped to documents upon search. By contrast, the Q-and-A system contains a Question database (Q-base) and an Answer database (A-base). The A-base is equivalent to a conventional knowledge base except that we allow answer documents to be contributed by outside users, not necessarily official subject matter experts, in direct response to a specific question. The Q-base consists of records of every query submitted to the system. The content of this database is generated by the users as they use the system. Any user can contribute a new question to the Q-base simply by asking a new question. If a query has been submitted previously, or has high semantic affinity to a previous question, the system uses the results from prior questions to optimize the user's experience. If the query is not found in the Q-base, a new entry is added. After accumulating data for a period of time it becomes possible to anticipate the most common and most successful queries and answers, making it possible to present a true and dynamic set of most frequently asked questions.

Furthermore, our approach enables *document and agent rating/ranking* for rating the efficacy of a document in the knowledge base as well as rating the contributors. Ranking/rating documents helps others locate useful results, much the way a search engine ranks results according to relevance. The ranking can either be implicit – by frequency of reference – or explicit – by asking users to provide feedback on how useful a document was to them. The ratings of documents can then be used to rate/rank the contributor of the document, providing an incentive system similar to the one used in Amazon. This allows workers to build their reputation, fosters a sense of community and can also be used as the basis for a concrete reward structure.

Another component to our solution supports *real-time expertise sharing* to improve the efficiency of agent communication. The component is built on top of an existing instant messaging protocol which is available without the need to locate or install any additional software. In a first implementation we used the context of the current

search or problem investigation to determine the subset of people with relevant expertise. Only “visible” experts are displayed at a given moment and context. Visibility is defined by the person’s willingness to be listed as available for consultation. The infrastructure provides support for experts to control their visibility through functions such as defining “office hours”, and setting the number of simultaneous questions they are willing to field through IM chat sessions.

Lastly, our solution includes *digital journaling* with a component called blogIT, which unifies multiple activity sources and depicts a comprehensive view of IT operations, including personal interactions and generated artifacts. blogIT is comprised of *data loggers* that automatically capture problem-solving activities, *annotation tools* that facilitate spontaneous recording and sharing of insights, and an *analytics engine* that performs concept extraction from the archived data. It integrates job ticket histories with other support activity such as email, chat sessions and phones calls into electronic chronicles. The chronicles can be annotated with relevant documents, RSS feeds, images, or video clips. Resolution records in blogIT can be reviewed by peers (other agents) for their usefulness and quality. The highest rated resolutions can then be incorporated into standard practices. By rating each other’s problem resolution tickets, agents acquire a certain level of recognition and respect among each other thus providing an incentive for agents to create more precise resolution records during *after call* activities. In initial trials with blogIT, we have recorded up to a 10% efficiency increase.

## 5 Conclusion

We have described the knowledge worker’s prisoner’s dilemma and how it manifests itself in the context of customer support. To address the dilemma, we have articulated an ambitious agenda regarding the support ecosystem which we are only in the early stage of implementing. Our solution includes a multi-pronged approach: (i) Wiki-fying knowledge resources, (ii) creating a Q-and-A based system that is more relevant and dynamic than the usual list of FAQs, (iii) pervading document and agent rating/ranking across KM systems, (iv) giving users real-time chat access to the right set of experts, and (v) creating a real-time assistance to the process of documentation with digital journaling. There is still much to do in order to realize our ultimate agenda of simply facilitating customers helping customers. For example, although we have succeeded in wiki-fying knowledge documents for use by call takers, we have not yet put this technology into the hands of end-users. The same is true for real-time expertise sharing and digital journaling with blogIT. While productivity gains seem to have been realized, but we only have preliminary quantitative results for blogIT. In many cases, the full spectrum of the benefit is non-trivial to measure, and will be the subject of our future work.

## References

1. Open Source Initiative (OSI), <http://www.opensource.org/index.php>
2. Poundstone, W.: Prisoner’s Dilemma. Doubleday, New York (1992)

