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## Article

# The importance of informal learning at work: On-the-job learning is more important for workers' human capital development than formal training

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# The importance of informal learning at work

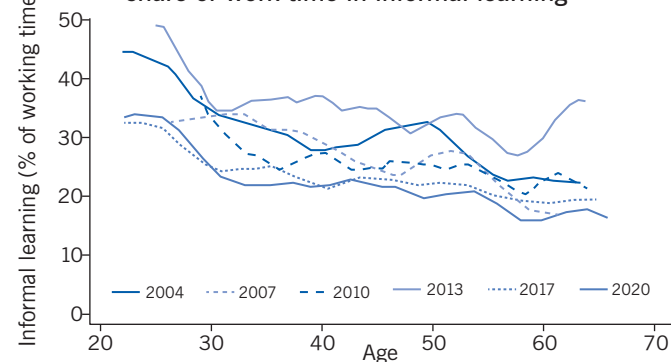
## On-the-job learning is more important for workers' human capital development than formal training

Keywords: informal learning, human capital, learning by doing, learning from peers, worker productivity

### ELEVATOR PITCH

Although early human capital theory recognized the relevance of workers' experience, its focus was on education and formal training. More recent studies show that much of the performance of newly hired workers is driven by learning by doing or learning from peers or supervisors in the workplace. Descriptive data show that workers learn a lot from the various tasks they perform on the job. Informal learning at work seems to be relevant for all age groups, although it is more meaningful for younger workers' performance. Informal learning is far more important for workers' human capital development than formal training courses.

Younger workers in the Netherlands spend a larger share of work time in informal learning



Source: [1].

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### KEY FINDINGS

#### Pros

- ⊕ Informal learning is more important to workers' performance than formal training.
- ⊕ Learning by doing is often an automatic by-product of productive work.
- ⊕ Informal learning is highly important for workers with temporary contracts.
- ⊕ New hires have a steep performance increase in their first year of employment.
- ⊕ Knowledge spillovers between peers in the workplace contribute to firm productivity.

#### Cons

- ⊖ Skills acquired through informal learning are less observable by other employers when compared to skills acquired through formal training.
- ⊖ Informal learning involves costs when less proficient workers are less productive in their job.
- ⊖ Most firms do not have adequate human resources strategies to optimize informal learning in the workplace.
- ⊖ The causal effects of informal learning on worker performance are still unclear.
- ⊖ The economic literature on informal learning is still underdeveloped.

### AUTHOR'S MAIN MESSAGE

Steep performance increases among new hires and the large share of work time in which workers perform tasks that impart new skills indicate that informal learning is the main driver of human capital development in the workplace. Knowledge spillovers among co-workers are also an important part of informal learning. Rapidly changing skill demands and rising retirement ages make informal learning even more important for workers' employability throughout their work life. However, policies still tend to emphasize education and formal training, and most firms dedicate insufficient efforts on optimizing the gains from informal learning at work.

## MOTIVATION

To remain competitive in the global economy, a firm's workforce must have adequate skills and be committed to keeping those skills up to date. As continuous technological change alters skill demands, policymakers emphasize lifelong learning. But the emphasis is usually on formal training courses to the neglect of informal learning in the workplace, which current evidence suggests to be far more important for workers' skill development. Although most firms are aware of the importance of informal learning, they insufficiently focus on optimizing the learning potential of the workplace to boost worker performance.

Human capital literature focuses mainly on investments in formal education and training. However, some studies have investigated learning by doing from a macroeconomic perspective—and more recently from a microeconomic one. Microeconomic studies on learning by doing usually attempt to measure the effects of work experience or tenure. Education (human resource development) science has a large research pool on workplace learning, which is defined as “the process of acquiring job-related knowledge and skills, through both formal training programs and informal social interactions among employees” [2], p.437. Remarkably, this definition does not include learning by doing. Meanwhile, the rich economic literature on peer effects in the workplace initially focused on effects due to social pressure [3]. More recent studies attempt to identify peer effects due to knowledge spillovers [4]. More comprehensively, informal learning in the workplace could be defined as the acquisition of skills through learning by doing as well as by watching other workers, taking instructions, receiving supervision or feedback from supervisors or co-workers and self-study. In the last decades, firms have also aimed to foster informal learning by corporate Learning Management Systems (LMS).

## DISCUSSION OF PROS AND CONS

### Economic literature on informal learning

The relevance of learning by doing was recognized by early human capital theorists. The earnings function, developed in the 1960s by Jacob Mincer, explains workers' wages based on education and work experience, though work experience was included mainly to better estimate the returns to education, which was the early focus of human capital theory. During the same era, but from a different macroeconomic and firm perspective, informal workplace learning was emphasized in explaining why an increase in per capita income cannot be fully explained by an increase in the capital-labor ratio and why an increase in knowledge accounts for part of economic growth [5]. This increase in knowledge, the study argues, is acquired by learning through experience: “Learning can only take place through the attempt to solve a problem and therefore only takes place during activity” [5], p.155. Various studies show that informal learning is an important driver of declining unit costs of production in manufacturing as well as in service sectors [6].

Other early theorists dealt with workplace learning more explicitly, focusing on the learning potential of a job: “The fundamental hypothesis is that individuals learn from their working experience. Firms supply learning opportunities in the form of different types of work-learning activities, and to that extent engage in a kind of joint production, for learning is a by-product of market goods production” [7], p.327. Thus, connecting the market for learning opportunities with the market for jobs yields package deals in which workers simultaneously sell the services of their skills and purchase a job that offers a particular opportunity to learn, though purchasing a job entails a cost. From a worker's

perspective, accepting a job at the start of one's career that enables the worker to develop the skills needed to obtain higher paying jobs later can be a good strategy to maximize lifetime income. This conceptual model was further developed in the theory of career mobility, which posits that workers may opt for a job with a high learning potential but a lower wage if it offers more opportunities for upward career mobility [8]. Likewise, from the worker's perspective, accepting a job with a low wage but a high learning potential can be a good strategy to maximize lifetime income [6].

The economic literature has also explored the impact of the high-performance workplace on the firm's performance, where a high-performance workplace is defined as a workplace that employs workers in jobs with a high learning potential. Although the high-performance workplace is not defined uniformly in the literature, many definitions include the delegation of responsibility to autonomous problem-solving teams, job duties that cover a wide range of tasks, and frequent job rotation. Obviously, workplace learning is at the heart of the high-performance workplace. First, workplace learning is a necessary complement to the continuously changing and increasing demand for skills. Second, offering jobs with a high learning potential will increase workers' motivation for their work and involvement in the firm [6].

Skill demands in the labor market change frequently in all sectors of the economy as a result of skill-biased technological and organizational changes, especially those associated with information technologies and related changes in the organization of the production process. Workplace learning is particularly important because of the growing demand for multi-skilled workers—workers with computer skills, problem-solving skills, and high-level communication and social skills—which induces a shift from “intratask learning” to “intertask learning” [9]. Intertask learning arises when workers can use the information and skills acquired at one task to improve their performance at other tasks [6]. Not all new technologies require more informal learning at the workplace, however. A study on call center agents distinguishes between different kinds of technological innovations developed in call centers [10]. While workflow automation technologies increase the learning time that new hires need to become fully competent in their job, technologies that facilitate the interaction between customer service agents and their customers reduce the time that new hires need to become fully competent.

However, technological and organizational changes are not merely a driver of changing skill demands. These changes also enable workers to learn at work, because workers usually learn the skills that are needed to work with a new technology in the workplace. This explains why workers who are employed in industries with high rates of technological change are better able to retain their productivity at an older age than workers in sectors that are less dynamic [6]. Workers who experience skill obsolescence appear to learn more on the job and participate more often in training, which lowers the risk of employment loss [11]. These studies suggest that the net effect of gradual technological and organizational change on workers' human capital is often positive, because workers continuously acquire new skills related to the new technologies they have to work with.

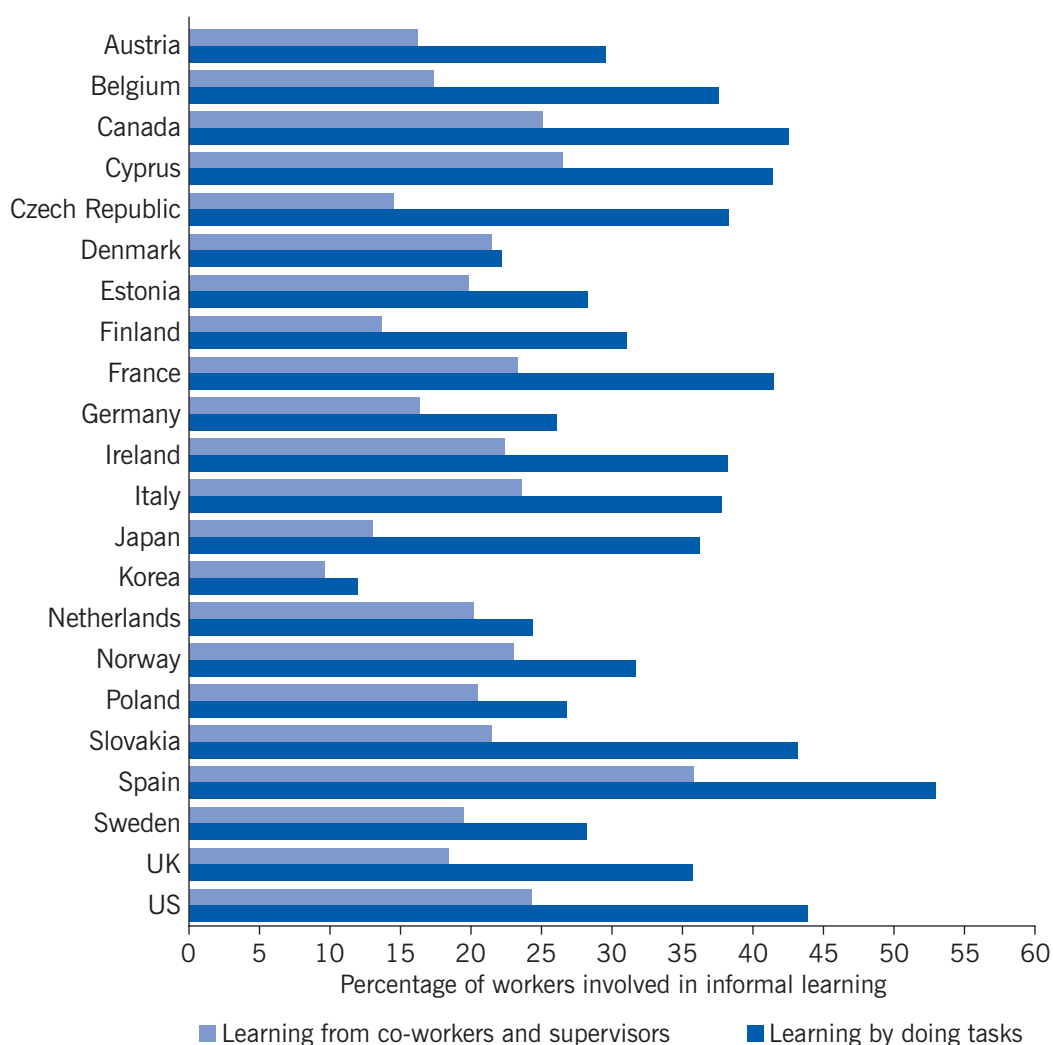
### Relevance of informal learning

OECD's Program for the International Assessment of Adult Competencies (PIAAC) measures the relevance of informal learning at the workplace in member countries. Many workers report that informal learning at work—learning by doing or learning from

supervisors or co-workers—is relevant for them on a daily basis, although there are large differences across countries (Figure 1). The percentage of workers who are involved in learning by doing every day ranges from 12% in Korea to 53% in Spain, while the percentage of workers who learn new things from supervisors or co-workers ranges from 10% in Korea to 36% in Spain.

Although this measure of learning by doing might be highly subjective, these differences across countries probably also reflect differences across countries in how work is organized as well as differences in related interactions in the workplace. Moreover, these differences might reflect variations in initial vocational education across countries. In that respect, some of the differences are remarkable, especially between Germany (where most workers acquire their vocational skills during formal apprenticeships) and the US (where workers have to acquire most occupational skills at work). In Germany, 26% of workers report engaging in learning by doing every day compared with 44% of workers in the US. That difference is also reflected in the extent to which workers learn new things from their supervisors or co-workers every day: 16% of workers in Germany compared with 24% in the US.

Figure 1. Many workers perceive that informal learning at work is relevant for them on a daily basis, selected OECD countries, 2012



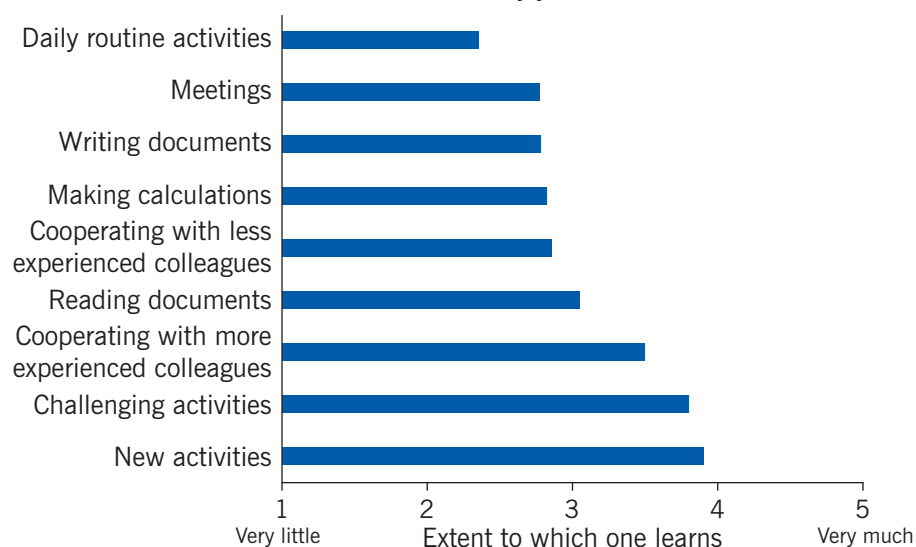
Source: OECD Skills Surveys. Paris: OECD, 2013. Online at: <http://www.oecd.org/site/piaac/>

A Dutch study that developed a measure of the time during which a worker is learning at work shows that in 2020 workers spent on average 22% of their working time on activities from which they learn. Since the first measurement in 2004, when workers were learning on average in 31% of their working time, this percentage gradually decreased. However, this is still far more than the time workers spend in formal training courses: informal learning activities account for 91% of the time in which workers are engaged in activities from which they learn [1]. Remarkably, workers on average perceive the learning intensity of an hour of informal learning to be as high as that of an hour of formal training. [12].

Given the finding that informal learning activities account for 91% of the time that workers are involved in activities from which they learn, informal learning in the workplace is far more important for the human capital development of the working population than formal learning. However, this does not mean that participation in formal training is not important. Formal training and informal learning appear to be complementary, although this finding is probably also due to a selection effect: In 2020, workers who participated in a training course spent on average 4.5 percentage points more time on informal learning in the workplace than workers who do not. However, for low-educated workers the difference is only 3.4 percentage points [1]. The Dutch study also shows that high educated workers spend on average more time on learning at work (25% of their working time) than low educated workers (18%). And as might be expected, younger workers spend more time on activities that improve their competencies than do older workers. However, the learning potential of work appears to have decreased over time.

In OECD countries, workers with a temporary contract have a higher rate of informal learning in their jobs, which compensates for their lower rate of training participation [13]. A study on 28 European countries shows that particularly workers who are under-skilled for their jobs more often learn informally. This suggests that having a job that initially mismatches the skills of workers increases informal learning [14]. The extent to which workers learn at work is indeed highly correlated with their job tasks (Figure 2) [12]. Workers learn particularly from engaging in new and challenging activities and from cooperating with more experienced colleagues.

Figure 2. The extent to which workers learn varies by job task, 2013



Source: Borghans, L., D. Fouarge, A. de Grip, and J. Van Thor. *Werken en leren in Nederland*. Maastricht University, 2014. ROA-R-2014/3. Online at: [http://roa.sbe.maastrichtuniversity.nl/roanew/wp-content/uploads/2014/05/ROA\\_R\\_2014\\_3.pdf](http://roa.sbe.maastrichtuniversity.nl/roanew/wp-content/uploads/2014/05/ROA_R_2014_3.pdf) [12].

## Steep performance increase of new hires

Building on the seminal work of Mincer, various studies find work experience to be a relevant determinant of worker performance. New hires, in particular, gain substantially from learning on the job. A study of workers who install car windshields finds a steep increase in performance over the first year of employment: after one year of work, they perform 82% better than they did when they started. A study on new hires in an inbound call center also finds a steep learning curve among newly hired call center agents that translates into a performance increase of 64% within the first year of employment [15].

In general, both the direct and indirect costs of investments in informal learning are expected to be lower than the costs of investments in formal training. Therefore, it is not surprising that workers spend much more time on informal training than on formal training. However, learning by doing does incur opportunity costs through forgone work time and lower productivity. Therefore, young workers are often expected to pay (part of) these opportunities costs by accepting a lower wage in an apprenticeship, internship, or traineeship position in their first year of employment [8].

## Knowledge spillovers among peers

New hires also benefit from knowledge spillovers from their more experienced peers in the workplace. Various studies show that team composition matters for peer learning. The study on call center agents shows that new hires placed in teams with more experienced peers perform significantly better than those placed in teams with less experienced peers [15]. Call center agents in less experienced teams need 161 hours of investment in learning on the job to become fully proficient, while agents in more experienced teams need 110 hours. A study on scientists and engineers finds that those who have been in a firm longer learn from their colleagues less often than those with shorter firm tenures. However, those who face a skill gap try to upgrade their skills by deliberately learning from their colleagues.

As mentioned, informal learning and participation in a formal training course are complementary activities. Moreover, this complementarity extends beyond the individual level. A worker's participation in a training course can have informal knowledge spillover effects on work mates. A randomized field experiment finds that the performance of call center agents who did not participate in a training course improved after their work mates had been trained [4]. Once half the members of a work team have been trained, the performance of untrained teammates improves by 2.5% — a quarter of the 10% performance increase of those who participated in the training course. This suggests that firms might benefit from smart training policy designs that include knowledge spillovers to other team members, as a less expensive alternative to training all workers.

## The effect of human resources practices on informal learning

Informal learning is also highly fostered by the learning culture in the organization. This particularly holds for coaching and getting regular positive as well as critical feedback from co-workers [1]. Also “new ways of working” —such as time- and location-independent work, management on output and access to organizational knowledge—have been shown to increase informal learning at work, mediated by the frequency with which employees receive feedback, with access to organizational knowledge as a direct driver of informal learning [16].

## **Other modes of learning: self-study and learning management systems**

The Dutch study on informal learning shows that 45% of all workers spend time on studying on their own, although this self-study on average only accounts for three hours per month. Self-study usually complements a course a worker follows [1]. In the last decades, also the supply of learning modes changed by the development of corporate LMS and Learning experience platforms (LXP) that offer tailor-made opportunities for online blended learning, combining a mix of learner and organization focused formal training and informal learning. More recently, preference for bite-sized learning, has led to the development of microlearning, including learning resources and recommendations in the flow of work that have the potential to increase learning-by-doing. Although these modes of remote learning are becoming more important, there aren't any studies yet that give insights into the use of these learning platforms or its impact on workers' performance.

## **Labor market non-transparency**

From a worker's perspective, a disadvantage of informal learning is that the skills acquired informally are less evident to other employers, which makes the informal learning less valuable in the labor market. Several countries have launched initiatives to recognize acquired competencies or to validate informal learning by skill assessments. Such efforts are an attempt to increase the labor market transparency of workers' informally acquired skills by certifying competencies acquired through informal learning in the workplace. However, this lack of transparency may also stimulate firms to invest in informal learning because it gives them more information about the productive skills of their employees than competing firms recruiting in the same segment of the labor market.

## **The impact of informal learning on workers' skill development**

A study on Cedefop's European Skills and Jobs Survey 2014 on 28 European countries shows that workers who participated in informal learning show greater improvement of their skills than those who did not [14]. The contribution of informal learning to workers' skill development appears to be larger than that of training participation, although those who participate in both formal training and informal learning experience a significant additional improvement of their skills

## **Sustainable employment**

Older workers have often been less exposed to the informal learning that plays a major role in keeping workers' skills up to date. Traditionally, older workers have had long tenures in jobs in which there was very little new learning in more recent years. In countries that have raised the mandatory retirement age in the last decade, this problem has become more severe. Older workers who continue to work until the new, higher retirement age might be less motivated to perform than younger workers. Thus, employers might face a skill-wage gap for these older workers. To create sustainable employment, older workers need opportunities to remain challenged in their jobs.

## LIMITATIONS AND GAPS

Research on informal learning in the workplace has been hampered by a lack of adequate data on informal learning, although OECD's PIAAC survey (see Figure 1) and Cedefop's European Skills and Jobs Survey have made a valuable start in producing internationally comparable data in this field. However, because of data limitations, most studies refer to a particular firm, sector, or country, which calls into question the generalizability of the study findings in other institutional settings.

Moreover, measures of informal learning need further development. Work is needed, in particular, on measures of time spent on activities from which a worker learns, of the learning potential of the tasks required in various jobs, and of knowledge spillovers in the workplace. Finally, the importance of informal learning for human capital development throughout a person's work life and its impact on firm performance highlight the need for better insights into the determinants of informal learning and its impact on workers' performance. Similarly, more knowledge is needed of the causal effects of informal learning on worker performance and of the causal effects of various human resources practices on informal learning—such as task and job rotation, peer and supervisor feedback, team composition and “new ways of working” as well as LMS—on worker performance.

## SUMMARY AND POLICY ADVICE

Keeping workers' skills up to date through informal learning is important for their employability because skill demands frequently change in response to technological and organizational innovations. Maintaining work skills has become even more urgent as workers need to remain employable longer because of the rise in many countries in the age at which workers are eligible to receive pension benefits.

Although the percentage of workers who are involved in learning by doing every day differs across countries, data on the Dutch working population clearly show that informal learning at the workplace is far more important for workers' human capital development than participation in formal training courses: informal learning activities account for 91% of the time workers spend on activities from which they learn [1]. Differences in informal learning in the workplace are likely due in part to differences in the workplace learning culture or to differences in other institutional settings between countries. Moreover, as the data from the Dutch Lifelong Learning survey suggest, “the learning potential” [7] of jobs in most sectors of industry can be expected to increase as jobs become more complex due to technological and organizational change. This underscores the importance of improving the workplace learning culture as a means of fostering human capital development in firms.

Workers learn most from engaging in new and challenging activities and from cooperating with more experienced colleagues. Workers appear to learn a lot from their peers in the workplace. Various studies provide causal evidence that team composition matters in this respect. The economic literature on high-performance workplaces suggests that delegating responsibility to autonomous problem-solving teams and creating jobs with a wide range of tasks and frequent job rotation can improve worker performance through informal learning and greater involvement in the firm. However, more knowledge of the causal effects of human resources practices, new ways of working and LMS on informal learning is required.

The finding that participation in formal training increases the productivity of co-workers who have not been trained themselves also has important implications for firms' training strategies [4]. It suggests that firms might benefit from training policies that internalize the externalities of training, thereby enabling them to train just some of their employees instead of all of them.

Creating a learning culture at the workplace should play a major role in a firm's human resource management strategy. Such a strategy can enable a firm to remain competitive both in its product market by delivering high-quality products and in the labor market by improving its attractiveness for highly productive individuals. Having a strong learning culture signals to potential employees that a firm offers ample opportunities for further skill development and sustainable employability. Public policy should facilitate the creation of such a culture of learning through a school curriculum that enables graduates to develop a positive attitude and receptivity toward learning in the workplace. Such policies can foster greater cooperation between schools and the business world in the co-creation of training courses that encourage further learning at the workplace.

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The author thanks an anonymous referee and the IZA World of Labor editors for many helpful suggestions on earlier drafts. Previous work of the author and his ROA colleagues contains a larger number of background references for the material presented here and has been used intensively in all major parts of this article [1], [4], [6], [10], [11], [12], [13], [14], [15], and [16]. Version 2 of this article updates figures and adds more recent empirical studies as well as a discussion on Learning Management Systems. It adds new key references [1], [3], [12], [13], [14], [15], and [16].

### **Competing interests**

The IZA World of Labor project is committed to the IZA Guiding Principles of Research Integrity. The author declares to have observed these principles.

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### Further reading

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